SOCIETY OF AMERICAN FORESTERS 1900

Journal of FORESTRY

October 1959
Volume 57
Number 10

Annual Meeting Issue

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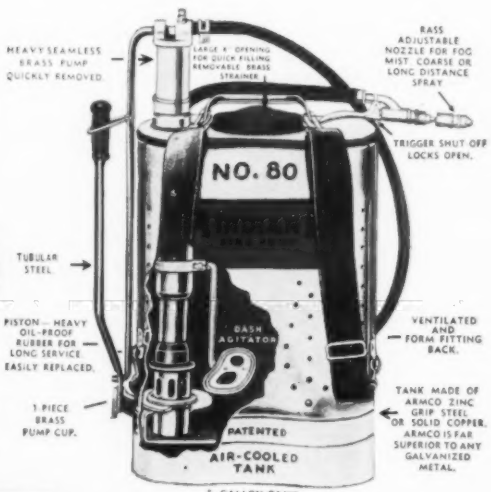
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HEAVY-DUTY WOODS EQUIPMENT FOR THE HARD WORK

VOLUME 57
NUMBER 10

Journal of Forestry

OCTOBER 1959

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Participants in the seeding operation here described, which will ultimately cover 20,000 acres, are the T. L. James Company, William F. Mann, Jr. of the U. S. Forestry Service, the State of Louisiana and Hawk Helicopters, a Charter firm of Fort Worth, Texas.

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Journal of Forestry

Official Organ of the Society of American Foresters

Annual Meeting

Society of American Foresters

San Francisco, California, November 15-19, 1959

With a possible total registered attendance of 1200 members, their ladies, and guests, the 59th annual SAF meeting will be held in San Francisco, November 15-18. The theme of the meeting is "Forestry and People."

Headquarters for the meeting will be the Sheraton-Palace Hotel. It will be the scene of the opening general session, the Society Affairs session, nine subject Division meetings, and the Society's annual reception and dinner.

President George A. Garratt will formally open the meeting at 9:30 a.m., on Monday, November 16. Samuel H. Bryan, chairman of the Northern California Section, will serve as chairman of this opening general session.

Schedule of Events

Sunday, November 15

SAF Council meeting; morning and afternoon.

Editorial Board, JOURNAL OF FORESTRY; afternoon.

Association of Consulting Foresters open meeting; evening.

Forest Tree Improvement Committee meeting; evening.

SAF Council and Section delegates joint meeting; evening.

Monday, November 16

General session; morning.

Society Affairs session; afternoon.

Alumni functions (no scheduled SAF meetings); evening.

Tuesday, November 17

Division of Silviculture meeting; morning and afternoon.

Division of Forest Products meeting; morning.

Division of Economics and Policy meeting; afternoon.

Division of Forest Recreation meeting; morning.

Division of Wildlife Management meeting; afternoon.

Ladies' tour to Monterey; all day.

Alumni and social functions (no scheduled SAF meetings); evening.

Wednesday, November 18

Division of Forest Management meeting; morning and afternoon.

Division of Education meeting; morning.

Division of Range Management meeting; morning.

Division of Watershed Management meeting; afternoon.

Reception and dinner; evening.

Thursday, November 19

Field trip to Santa Cruz Mountains; all day.

Preconvention Meetings

November 13. Evening meeting of foresters representing schools of forestry at land-grant colleges and universities, Sheraton-Palace Hotel.

November 13 and 14. A meeting at the Institute of Forest Genetics, Placerville, Calif. of the SAF Tree Improvement Committee and the Western Forest Genetics Association. Program on page 717.

November 14. Closed meeting of the Council of Forestry School Executives, School of Forestry, University of California, Berkeley, Calif.

The Field Trip

Following the theme of the general meeting the 1959 field trip is organized around the theme of "California Forestry and People in Miniature," and is designed to give a one-day look at some

(Photo by F. Landenberger, California Redwood Association.)

RECENT cutover on selectively logged area of Korbel Woods. Simpson Redwood Company.

of the state's forest practices, interesting forest types, and a changing pattern of forestry brought on by increasing population.

The trip, for men only, will be on Thursday, November 19, and will be to the Santa Cruz area 70 miles south of San Francisco. Here the group will visit one of the highly interesting forest areas in the West because of its great variety of tree species, vegetative types, topography soils, climate, and forest use patterns.

Santa Cruz is the heart of the southern redwood belt with notable stands of old- and young-growth redwood and Douglas-fir. There will be opportunity to observe the ecology and silviculture of this forest type.

Plans include visits to the Big Basin State Park which is a grove of virgin redwood dedicated to recreational use, to young stands for a look at the remarkable growth potential of this species, to a state forest nursery, and to an old-growth redwood logging operation to see how the "big ones" are handled.

Also planned is a glimpse of Monterey pine in its native habitat, a discussion of the hardwood and brush types and their protection and use problems. Recreational use of this forest area with its relatively dense population in combination or in conflict with commercial utilization of the timber will be a recurring point of discussion throughout the trip.

Travel will be by chartered bus with a "host" from the Northern California Section in each to answer questions and provide background and continuity to the program. Because several buses will be used and the route includes some fairly difficult driving conditions, no private passenger cars will be permitted. Plans are to leave the Sheraton-Palace Hotel at 8 a.m. and return by 6 p.m. Lunch will be provided in the field. Total cost including lunch and transportation is estimated at $5.

Those desiring to take part will be asked to register in advance. Tickets may be obtained at the general registration desk.

Program for Ladies

Sunday, November 15

Registration—12:30-8:30 p.m.

Afternoon Coffee—3:00-5:00 p.m., Ladies Lounge, Sheraton-Palace Hotel.

Monday, November 16

Continental Breakfast — 9:00 a.m., Ladies Lounge, Sheraton-Palace Hotel.

The ladies are invited to be guests at this affair and it is urged that all in attendance at the meeting be present.

(Photo courtesy California Redwood Assn.)

SCENE in virgin redwood forest, U. S. Highway 101, Calif.

Registration will be completed and the plans for entertainment and for the enjoyment of a San Francisco visit will be presented.

Afternoon: Free for sightseeing and shopping.

Tuesday, November 17

Monterey Peninsula Tour—Leave Southern Pacific Station, Third and Townsend Streets, San Francisco 8:17 a.m.

Return 7:00 p.m.

This all-day tour will offer a ride through an interesting part of California on a luxury train carrying a snack car and lounge cars.

At Monterey transfer will be made to busses for a trip around the historic and beautiful Monterey peninsula. Stops of unusual interest will be made at historic homes, Del Monte Lodge and Pebble Beach, Carmel for shopping and lunch and at the Mission San Carlos Borromeo de Carmelo. The California ladies who have planned this trip are sure that it, too, will be a most memorable and exciting experience. For fuller description of trip see page 599 of August JOURNAL.

Wednesday, November 18

Morning: A no-expense tour of an area of San Francisco which will enchant every lady. The details and description of this tour will be given at the breakfast on Monday morning, November 16.

Afternoon: Free for matinees, sightseeing, or shopping.

Evening: SAF annual dinner at the Sheraton-Palace Hotel.

Thursday, November 19

Morning: Bus tour to Muir Woods. This will be an optional tour for those who wish to see the magnificent coast redwoods. The field trip of the Society will not be available to the ladies.

Afternoon: Free for sightseeing or shopping.

General Meeting

Monday morning, November 16
Theme: Forestry and People

Samuel H. Bryan, Chairman

1. Welcome by the President, George A. Garratt.

2. "The Impact of Population on Forest Management." Charles A. Connaughton, California Region, U. S. Forest Service, San Francisco, Calif.

3. "Industry Responsibilities and Vulnerability to Population Growth." Clarence W. Richen, Northwest Timber Department, Crown Zellerbach Corporation, Portland, Ore.

4. "Twenty Years of Population and Forestry Advances." Henry J. Vaux, School of Forestry, University of California, Berkeley, Calif.

Society Affairs Session

Monday afternoon, November 16

George A. Garratt, President
Henry J. Malsberger, Vice President
Henry Clepper, Executive Secretary

1. Report of the President.

2. Report of the Executive Secretary.

3. Report of the Editor of Society publications, Arthur B. Meyer.

4. Report of the Editor of *Forest Science*, Stephen S. Spurr.

5. Report of the Committee on International Relations, V. L. Harper.

6. Progress Report on the Study of Education in Forestry and Related Fields of Natural Resources Management, Samuel T. Dana, Director.

7. Report of the Committee for the Advancement of Forestry Education, Frank H. Kaufert, Chairman.

Panel Discussion

State Registration and Licensure of Foresters

Henry J. Malsberger, Moderator

1. "Basic Principles Involved in Registration and Licensing of Foresters." Terrill D. Stevens, Department of Forestry, Michigan State University, East Lansing, Mich.

2. "Needs Involved in Registration and Licensing of Foresters." Wilbur B. DeVall, Department of Forestry,

Alabama Polytechnic Institute, Auburn, Ala.

3. "Experiences Involved in Registration and Licensing of Foresters." Archie E. Patterson, School of Forestry, University of Georgia, Athens, Ga.

4. Open discussion.

Division of Silviculture

Tuesday morning, November 17

William H. Cummings, Chairman
Jesse H. Buell, Vice Chairman
Gilbert H. Schubert, Secretary

1. "Tropical Silviculture." I. T. Haig, U. S. Forest Service, Washington, D. C.

2. "Prescribed Burning in Loblolly Pine Management." Thomas Lotti, Southeastern Forest Experiment Station, Charleston, S. C.

3. "Vegetational Development Following Burning in the Boreal Forest of Minnesota." Clifford E. Ahlgren, Quetico-Superior Wilderness Research Center, Ely, Minn.

4. "Fire Environment and Silvicultural Practice." Clive M. Countryman, Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.

5. Report of the SAF Committee on Natural Areas. John F. Shanklin, Technical Review Staff, U. S. Department of the Interior, Washington, D. C.

6. Report of the SAF Committee on Forest Tree Improvement. R. T. Bingham, Intermountain Forest and Range Experiment Station, Moscow, Idaho.

Tuesday afternoon, November 17

1. "Problems of Pine Seed Supply in the Southeast." P. E. Hoekstra, Southeastern Forest Experiment Station, Lake City, Fla.

2. "Selecting the Proper Seed Source of Ponderosa Pine." Robert Z. Callaham, Intermountain Forest and Range Experiment Station, Spokane, Wash.

3. "Partial Cuttings in Mature Stands of the Western White Pine Type." Charles A. Wellner, Intermountain Forest and Range Experiment Station, and Raymond J. Boyd, U. S. Forest Service, Ogden, Utah.

4. "Photosynthetic Limits of Forest Type Yields." Henry Helmers, Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif., and James Bonner, California Institute of Technology, Pasadena, Calif.

5. "Nutrition of Forest Trees." H. A. Fowells, U. S. Forest Service, Washington, D. C.

Division of Forest Recreation

Tuesday morning, November 17

Frank W. Childs, Chairman
William A. Parr, Vice Chairman
Henry A. Harrison, Secretary

1. "Ruminations on Recreation." Newton B. Drury, former director of the National Park Service and former chief, Division of State Parks, State of California, Berkeley, Calif.

2. Panel Discussion: "Recreation Across the Nation."

"Western States." Lawrence C. Merriam, National Park Service, San Francisco, Calif.

"Central States." M. M. Nelson, U. S. Forest Service, Washington, D. C.

"Eastern States." Charles H. Stoddard, Jr. Resources for the Future, Inc., Washington, D. C.

3. Progress Report—1960 Winter Olympics, Squaw Valley. W. S. Davis, U. S. Forest Service, San Francisco, Calif.

4. "Northeastern Forests: We See Them for the People." Richard W. Lane, U. S. Forest Service, Washington, D. C.

5. Business meeting.

Division of Forest Products

Tuesday morning, November 17

Bernard M. Granum, Chairman
Rudolph F. Grah, Vice Chairman
Harvey D. Erickson, Secretary

1. "Wood at its Apogee?" Fred E. Dickinson, Director, Univ. of California Forest Products Laboratory, Richmond, Calif.

SAMUEL M. BRYAN, Chairman, Monday Morning General Meeting.

2. "Utilization from Forest to Finished Products." Richard D. Roseberry, Diamond-Gardner Corporation, Chico, Calif.

3. Panel Discussion: "Log Grading and Utilization." Moderator, C. R. Lockard, U. S. Forest Service, Washington, D. C.

"The Overall Picture." C. R. Lockard, U. S. Forest Service, Washington, D. C.

"Considerations Basic to Timber Quality Evaluation Systems." C. A. Newport, Pacific Northwest Forest Experiment Station, Portland, Ore.

"Does Site Affect Grade Yield?" Robert A. Campbell, Southeastern Forest Experiment Station, Asheville, N. C.

"Specific Gravity—A Measure of Intrinsic Timber Quality." H. M. Mitchell, Forest Products Laboratory, Madison, Wis.

"Hardwood-Softwood Quality Relations." J. A. Putnam, Hardwood Specialist, Stoneville, Miss.

4. "Redwood . . ." Nicholas V. Poletika, Union Lumber Company, Fort Bragg, Calif.

5. Division Business Session.

Division of Forest Economics and Policy

Tuesday afternoon, November 17

John A. Zivnuska, Chairman
H. R. Josephson, Vice Chairman
James G. Yoho, Secretary

Panel Discussion: "Public Timber Sale Policies and Economic Development in the Western United States."

1. "The Public Timber Resource of the West." John A. Zivnuska, School of Forestry, University of California, Berkeley, Calif.

2. "The Economics of Public Timber Sale Programs." Ira J. Mason. U. S. Forest Service, Washington, D. C.

3. "The Impact of Public Timber Sale Programs on the Western Forest Industries." George A. Craig, Western Lumber Manufacturers, Inc., San Francisco, Calif.

4. "Public Timber and Small Business." Charles H. Stoddard, Resources for the Future, Inc., Washington, D.C.

5. "Public Timber and the Diversified Forest Products Operation." A. C. Shaw, Champion Paper and Fibre Company, Hamilton, Ohio.

6. "Public Policy and Economic Development." Walter J. Mead, Department of Social Sciences, University of California, Santa Barbara, Calif.

7. Discussion.

8. Business session and election of officers.

(Photo by California Division of Beaches and Parks.)

PARK naturalist and party on Rubicam Trail, D. L. Bliss State Park, Lake Tahoe, Calif.

Division of Forest-Wildlife Management

Tuesday afternoon, November 17

Lansing H. Parker, Chairman
James B. Gilligan, Vice Chairman
Howard A. Miller, Secretary

1. "The Long-Range Wildlife Management Program of the U. S. Forest Service." Lloyd Swift, U. S. Forest Service, Washington, D. C.

2. "The Problems in the Use of Systemic Rodenticides." Nelson Kverno, U. S. Fish and Wildlife Service, Olympia, Wash.

3. "Use of Radioactive Scandium 46 to Determine Seed Losses by Animals." William Lawrence and J. H. Rediske, Weyerhaeuser Forestry Research Center, Centralia, Wash.

4. "Deer Range Improvement and Prescribed Burning in Ponderosa Pine." Harold H. Biswell, School of Forestry, University of California, Berkeley, Calif.

5. "The Effects of Current West Coast Logging Practices upon Fisheries Resources." Willis Evans, California Department of Fish and Game, Sacramento, Calif.

6. Business meeting.

Division of Forest Management

Wednesday morning, November 18

Russell K. LeBarron, Chairman
Thomas B. Glazebrook, Vice Chairman
Frank D. Irving, Jr., Secretary

Donald W. Lynch, Program Chairman

Symposium: "Predicting Forest Growth and Calculating Allowable Cut"

Kenneth P. Davis, Moderator

1. "The Problem of Determining Optimum Levels of Growing Stock for Managed Stands." George R. Staebler, Weyerhaeuser Timber Company, Centralia, Wash.

2. "Rotations for Managed Forests." Lawrence S. Gross, U. S. Forest Service, Washington, D. C.

3. "Quantification and Estimation in Future Forest Management." Lewis R. Grosenbaugh, Southern Forest Experiment Station, New Orleans, La.

4. "Calculating Allowable Cuts in Northern Rocky Mountain Forests." John R. Castles, U. S. Forest Service, Missoula, Mont.

5. "Growth and the Allowable Annual Cut." John F. Bell, Oregon State Board of Forestry, Salem, Ore.

6. "Regulated Forest Management —Southern Style." B. E. Allen, Union Bag-Camp Paper Corporation, Savannah, Ga.

Wednesday afternoon, November 18

Donald W. Lynch, Session Chairman

1. Report of Nominating Committee and election of officers for 1960.

2. "Measuring the People Threat to Forest Managers." Craig Chandler, U. S. Forest Service, Glendora, Calif.

3. "Intermountain System of Fire Danger Rating." Charles E. Hardy and A. F. Brackebusch, U. S. Forest Service, Missoula, Mont.

4. "Fighting Forest Fires from the Air." Clinton B. Phillips, California Division of Forestry, in cooperation with Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.

5. "Effects of Growing Space on Wood Specific Gravity in Loblolly Pine." Robert M. Echols, Southern Forest Experiment Station. Gulfport, Miss.

6. "A Test of Continuous Inventory for National Forest Management Based Upon Aerial Photographs, Double Sampling, and Remeasured Plots." C. Allen Bickford, Northeastern Forest Experiment Station, Upper Darby, Pa.

7. "Estimating Timber on Small Tracts by Direct Photogrammetric Methods." Karl E. Moessner, Intermountain Forest and Range Experiment Station, Ogden, Utah.

Division of Education

Wednesday morning, November 18

Peter W. Fletcher, Chairman
William C. Bramble, Vice-Chairman
John Carow, Secretary

Panel discussion: "Identifying and guiding future forest researchers."

1. Undergraduate preparation for:
"Research in tree physiology." Robert E. McDermott, School of Forestry, University of Missouri, Columbia, Mo.
"Research in wood technology." William T. Nearn, School of Forestry, The Pennsylvania State University, University Park, Pa.

2. Graduate preparation for:
"Research in forest genetics." Scott S. Pauley, School of Forestry, University of Minnesota, St. Paul, Minn.
"Research in forest economics." John A. Zivnuska, School of Forestry, University of California, Berkeley, Calif.

3. On the job training for:
"Industrial research."
"Governmental research." T. F. McLintock, U. S. Forest Service, Washington, D. C.

4. Open discussion.

5. Business meeting.
"Safety creed and safety code." Seth Jackson, Chairman, Committee on Safety, SAF, Washington, D. C.
Election of officers.

Division of Range Management

Wednesday morning, November 18

Joe A. Wagner, Chairman
R. M. De Nio, Vice Chairman
Lowell K. Halls, Secretary

1. "Compatability of Forage and Timber Production on Ponderosa Pine

Lands." Avon Denham, U. S. Forest Service, Portland, Ore.

2. Role of Grass Seeding in the Rehabilitation of Disturbed Areas Following Logging and Fire." James E. Sowder, Lake States Forest Experiment Station, Saint Paul, Minn.

3. "Impacts of Competitive Land Uses on the Production of Adequate Timber Supplies from Private Lands." Paul E. Shively, Fibreboard Products, Inc., San Francisco, Calif.

4. "Improving Cover on California Rangelands to Meet Increasing Demands for Wildlife and Livestock Forage." E. J. Woolfolk, Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.

5. "California Brushlands: Their Characteristics and Utilization." Arthur W. Sampson, School of Forestry, University of California, Berkeley, Calif.

6. "Planned Burning as a Management Practice for Wild Lands." L. T. Burcham, California Division of Forestry, Sacramento, Calif.

Division of Watershed Management

Wednesday afternoon, November 18

Sidney Weitzman, Chairman
Jack S. Rothacher, Vice Chairman
Paul J. Zinke, Secretary
Charles A. Connaughton, Moderator

1. "The National Water Situation—Today and in the Future." E. L. Henricks, Geological Survey, U. S. Department of the Interior, Washington, D. C.

2. "State and Local Activities to Meet Growing Water Needs." Harvey O. Banks, California Department of Water Resources, Sacramento, Calif.

3. "The Role of Public Forest Land in Watershed Management." J. K. Vessey, U. S. Forest Service, Atlanta, Ga.

4. "The Role of Private Forest Land in Watershed Management." Carl J. Johnson, Interstate Commission on the Potomac River Basin, Washington, D. C.

5. "Forest Watershed Research—Its Accomplishments and Opportunities." Marvin Hoover, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

6. Discussion period.

7. Business session.

The Society Dinner

Wednesday evening, November 18

William D. Hagenstein, Toastmaster

SOCIETY OF AMERICAN FORESTERS

1959 Annual Meeting

San Francisco, California. November 15, 16, 17, and 18

Housing Committee, Society of American Foresters,
Room 300, 61 Grove Street,
San Francisco 2, California.

First choice hotel _____

Second choice hotel _____

Third choice hotel _____

Please make a reservation for the following room accommodations for arrival on November———, a.m. p.m. Departure———, a.m. p.m.

I understand that accommodations will be provided at the daily rate specified, if available; otherwise the nearest rate available will apply.

——— Single room with bath. Rate $———.

——— Double-bed room with bath. Rate $———.

——— Twin-bed room with bath. Rate $———.

——— Suite (parlor, twin-bed room, and bath). Rate $———.

——— Other. (Specify accommodations desired.) Rate $———.

The above accommodations are requested for the following persons in addition to myself. (Please print or typewrite names and addresses legibly.)

_____

_____

_____

My name: _____

Street address: _____

City, zone, state: _____

Enclosed is a deposit in the amount of $———.

Important Notice: Members submitting requests for hotel reservations are asked to indicate below if their wives will wish to go on the all-day tour for ladies to Monterey on Tuesday, November 17.

☐ My wife wishes to go on the ladies' tour.

MAP OF DOWNTOWN San Francisco showing the relative location of hotels that are cooperating with the SAF Housing Committee for the 1959 annual meeting.

Hotels

A. Sheraton-Palace Hotel.
B. Bellevue Hotel.
C. Beverly Plaza Hotel.
D. Californian Hotel.
E. Chancellor Hotel.
F. Clift Hotel.
G. Drake Wiltshire Hotel.
H. Manx Hotel.
J. St. Francis Hotel.
K. Sir Francis Drake Hotel.
L. Stewart Hotel.
M. Sutter Hotel.
N. Whitcomb Hotel.
P. YMCA

Motels

R. Broadway Manor Motel.
S. Lombard Plaza Motel.
T. Market Street Travelodge.

For a listing of points of interest in California turn to back of issue.

1. Presentation of the Society of American Foresters award for achievement in biological research, by President George A. Garratt.

2. "Our Western Frontier." James H. Shoemaker, Vice President, Bank of Hawaii.

3. Entertainment with a Spanish-American theme.

Hotel Reservations

Those planning to attend the meeting are advised to arrive in San Francisco on Sunday, November 15, or not later than 9 a.m., Monday, November 16. The first general session will start at 9:30 a.m., Monday, in the Sheraton-Palace Hotel.

The Sheraton-Palace, on Market Street at New Montgomery Street, will be the headquarters for the meeting. The zone number is San Francisco 19.

This hotel has 700 rooms, but it will not be able to accommodate all those in attendance. Hence, other cooperating hotels are making space available.

All requests for room reservations should be sent to the Society of American Foresters Housing Committee, Room 300, 61 Grove Street, San Francisco 2, Calif. All reservations will be confirmed if the requests are received not later than October 31.

For each room reserved, there should be an accompanying deposit of $10. Checks should be made payable to SAF Housing Bureau.

Reservations will be accepted and confirmed in the order of their receipt. Assignment of rooms will be made at, or as near, the desired rate as possible. Early reservation requests are desirable.

The reservation coupon on page 715 may be used. Readers who do not want to cut the coupon from their JOURNALS may request reservations by letter, provided all the information listed on the coupon is given.

Cancellations must be received 15 days prior to the meeting for refunds of deposits to be made by the hotel. If sufficient time is not allowed for the hotel to reassign space, the deposit is forfeited.

Hotels and Rates

All rates quoted are with bath; these are daily rates.

Sheraton-Palace Hotel, Market Street at New Montgomery Street; 700 rooms; adjacent garage. Single occupancy: $11 to $21. Double-bed rooms: $15 to $25. Twin-bed rooms: $15 to $25. Parlor suites: $28 up.

Bellevue Hotel, 505 Geary Street,

at Taylor; 250 rooms; garage attached. Four blocks from Sheraton-Palace. Single occupancy: $7.50 to $10. Double-bed rooms: $9.50 to $12.50. Twin-bed rooms: $11 to $15.

Beverly-Plaza Hotel, 342 Grant Avenue, at Bush Street; 200 rooms. Six blocks from Sheraton-Palace. Single occupancy: $7 to $9. Double-bed rooms: $9 to $11. Twin-bed rooms: $10 to $12.

Californian Hotel, 405 Taylor Street at O'Farrell Street; 300 rooms; garage next door. Six blocks from Sheraton-Palace. Single occupancy: $9 to $11. Double-bed rooms: $11 to $13. Twin-bed rooms: $11 to $14.

Chancellor Hotel, 433 Powell Street; 150 rooms; garage service. Six blocks from Sheraton-Palace. Single occupancy: $7. Double-bed rooms: $9. Twin-bed rooms: $10.

Clift Hotel, Geary at Taylor Street; 400 rooms. Six blocks from Sheraton-Palace. Single occupancy: $13 to $21. Double-bed rooms: $15 to $17. Twin-bed rooms: $16 to $23.

Drake Wiltshire Hotel, 340 Stockton Street; 250 rooms; garage available. Four blocks from Sheraton-Palace. Single occupancy: $10 to $11. Double-bed rooms: $12 to $14. Twin-bed rooms: $15 to $16.

Manx Hotel, 225 Powell Street; 300 rooms; garage service. Four blocks from Sheraton-Palace. Single occupancy: $6 to $9. Double-bed rooms: $9 to $11. Twin-bed rooms: $10 to $12. Parlor suites: $15 and $20.

St. Francis Hotel, Powell and Geary Streets (Union Square); 1,000 rooms. Four blocks from Sheraton-Palace. Parking in Union Square garage. Single occupancy: $11 to $22. Double-bed rooms: $13 to $20. Twin-bed rooms: $16 to $25. Parlor suites: $30 to $50.

Sir Francis Drake Hotel, 450 Powell Street, at Sutter; 600 rooms; basement garage. Six blocks from Sheraton-Palace. Single occupancy: $10.50 to $15.50. Double-bed rooms: $12.50 to $17.50. Twin-bed rooms: $15.50 to $20.50. Suites: $34 up.

Stewart Hotel, 351 Geary Street, at Union Square; 400 rooms, garage service. Four blocks from Sheraton-Palace. Single occupancy: $7 to $10. Double-bed rooms: $8 to $10. Twin-bed rooms: $10 to $18.

Sutter Hotel, 191 Sutter Street; 200 rooms. Two blocks from Sheraton-Palace. Single occupancy: $5 to $7. Double-bed rooms: $7 to $9. Twin-bed rooms: $8 to $10.

Whitcomb Motor Hotel, 1231 Market Street, at 8th; 500 rooms; ample parking. Seven blocks from Sheraton-Palace. Single occupancy: $7 to $12. Double-bed rooms: $9 to $16. Twin-bed rooms: $10 to $16.

YMCA, 351 Turk Street. Seven blocks from Sheraton-Palace. Single occupancy: $4.25 to $5.50. Double-bed rooms: $5.25 to $6. Twin-bed rooms: $7.

Motels and Rates

San Francisco has 30 motels. A list of them with their addresses and daily rates may be obtained on application to the Convention and Visitors Bureau, 300 Civic Auditorium, 61 Grove Street, San Francisco 2, Calif.

In requesting a motel reservation, payment equal to the daily rate but in no case less than $8 should accompany the reservation. Checks should be made payable to SAF Housing Committee.

The following motels will make rooms available if reservations are made at least 15 days in advance:

Broadway Manor Motel, 2201 Van Ness Street at Broadway. About 30 blocks from Sheraton-Palace. Single occupancy: $8 to $12. Double-bed rooms: $10 to $12. Twin-bed rooms: $12 to $14.

Lombard Plaza Motel, 2026 Lombard Street; U. S. Route 101. Two miles from Sheraton-Palace. Single occupancy: $6 to $8. Double-bed rooms: $8 to $10. Twin-bed rooms: $9 to $12.

Market Street Travelodge, 1707 Market Street. Fourteen blocks from Sheraton-Palace. Single occupancy: $8 to $10. Double-rooms: $9 to $12. Twin-bed rooms: $11 to $14.

Committees for the Meeting

General Chairman, John Callaghan, 1307 Teneighth Way, Sacramento, 18, Calif.

Program Committee, Keith Arnold, chairman, Pacific Southwest Forest and Range Experiment Station, P. O. Box 245, Berkeley 1, Calif.; John R. Dilworth, Edwin F. Heacox, James K. Mace, Knox Marshall.

Committee on Local Arrangements, B. H. Payne, chairman, T. H. Harris, vice chairman, U. S. Forest Service, 630 Sansome Street, San Francisco 11, Calif.

Mrs. DeWitt Nelson, Ladies Activities.

Clyde Walker, Information and Publicity.

George A. Craig, Exhibits.

Robert Colwell, Meeting Rooms.

Rudolph F. Grah, Field Trip.

Grant A. Morse, Housing and Registration.

William R. Schofield, Entertainment.

Meeting of SAF Tree Improvement Committee and Western Forest Genetics Association

at Institute of Forest Genetics
Placerville, Calif.

Friday, November 13

F. I. Righter, Tour Leader

Conducted tour of Institute of Forest Genetics and field trip to grounds, arboretum, nursery, and outplantings.

Saturday, November 14

R. T. Bingham, Program Chairman.

1. "Geographic Variation in Ponderosa Pine Seedling Physiology." Robert Z. Callaham, Intermountain Forest and Range Experiment Station, Spokane, Wash.

2. "Variations in Crown-Form Attributes in Populations of Douglas-fir." Robert K. Campbell, College of Forestry, University of Washington, Seattle, Wash.

3. "Provenance Study of Douglas-fir in the Pacific Northwest Region (Nursery Performance)." Kim K. Ching and Dale N. Bever, Oregon Forest Lands Research Center, Corvallis, Ore.

4. "Effect of Elevation and Climatic Factors on Production and Dispersal of Coniferous Tree Pollen." Lorne F. Ebell, Forestry Branch, Canadian Department of Northern Affairs and Natural Resources, Victoria, B. C., and Ralph L. Schmidt, British Columbia Forest Service, Victoria, B. C.

5. "Some Thoughts on Seed Orchards and Their Establishment." Bent Gerdes, Firseed, Inc., Eugene, Ore.

6. "A Douglas-fir Seed Orchard: First Year Results." Thomas E. Greathouse and Virgil Allen, U. S. Forest Service, Portland, Ore.

7. "Timing of Pollen Application in Relation to Viable Seed Yield in *Pinus strobus*." Howard B. Kriebel, Ohio Agricultural Experiment Station, Wooster, Ohio.

8. "Kinds of Racial Variation and Their Significance." Thomas O. Perry, California Institute of Technology, Pasadena, Calif.

9. "Heritability of Juvenile Growth Rate in Western White Pine." A. E. Squillace and R. T. Bingham, Southeastern Forest Experiment Station, Lake City, Fla.

10. "Natural Variation of *Populus tremuloides* and *P. dentata* in Northern Lower Michigan." Burton V. Barnes, Northern Idaho Forest Genetics Center, Moscow, Idaho.

Advantages and Functions of a Professional Society[1]

Henry J. Vaux

IN ORDER to talk understandably about this topic it is necessary first to consider the questions: What is a profession? What distinguishes the professional from the nonprofessional? If one looks at the activities generally regarded as professional in character they appear to possess in an unusual degree four central characteristics.

These are: (1) An organized body of theory fundamental to practice of the profession and little understood by the public at large. (2) An authority which is clearly recognized and understood by the public; one indication of this authority is the fact that the nonprofessional has customers—the customer is always right; in contrast the professional has clients and the client regards the professional as speaking with authority to the client's condition. (3) A sanction from the community which ordinarily permits the profession to exercise control over training, admission to it, and related matters. (4) Recognition by the profession of its responsibility to the public, through adopting and enforcing on its members a code of ethics.

There may be additional essential characteristics of a profession but I think that these four aspects will serve to distinguish the professional from the nonprofessional for purposes of the following discussion.

What are the functions of a professional society? In the broadest sense it seems to me that the central function of such a society is to establish a concept or an image of the profession in the minds of both its members and the general public. This overall function or objective is especially important in the case of a young profession where such a concept may not be widely understood.

The Society of American Foresters states its own functions and objectives in the following words: "To represent, advance and protect the interests and standards of the profession of forestry, to provide a medium of exchange for professional thought, and to promote the science, practice and standards of forestry in America." It seems to me that nonprofessional associations can and do carry out the functions involving exchange of thought and the promotion of the science and practice of forestry. The key professional objective in the above statement therefore is "To represent, advance and protect the interests and standards of the profession."

In carrying out this objective the Society of American Foresters functions along three lines. First of all it conducts certain activities which serve to *define* the profession of forestry. This is done basically through the establishment of standards of admission to and advancement in the Society and through the accreditation of professional education. Advancement depends upon qualifying professional experience. Standards of admission are based on professional academic training. A difficult problem here is that of the appropriate breadth of the professional area. If the standards of admission are too narrow and too specific they may result in ruling out groups with close ties to the professional interest. On the other hand, if the standard is too broad or flexible the definition may lose the focus needed if the public is to accept the concept as professional rather than as a loosely linked collection of technologists.

Wherever standards of admission to the professional society are based on academic training, the function of accreditation of professional education becomes a central one for the society. Obviously without such accreditation the admission standards may have little or no meaning.

The establishment of admission and accreditation standards defines the profession, and enforcement of these standards protects members and the public from violation of these standards. But if this protection and control over the profession is to be effective, public sanction and public acceptance of the profession must be generated. This leads to a second major function of the professional society, that of securing its acceptance by the public.

In this direction the Society of American Foresters functions through establishment and enforcement on its members of a code of ethics; through recognition of nonprofessional conduct; and through procedures for censure or other disciplinary action against those guilty of such conduct. The Society's Committee on Licensing and Registration and the activities of a number of the geographic Sections serve to promote legal sanctions for the profession. Through its Committee on Civil Service, Committee on Policy, various actions by the national Council, and by membership referenda the Society may also define the position of the profession on pertinent issues of public policy. Through formation of joint committees with other professional and scholarly bodies, and through official representation of the Society on agencies such as the National Research Council or the American Association for the Advancement of Science, the work of the organization

THE AUTHOR is dean, School of Forestry, University of California, Berkeley.

[1]Presented to the meeting of the American Institute of Wood Engineers at San Francisco, June 28, 1959.

and of the profession may be called to the attention of the public at large in a way which lends prestige.

The third major function, that of advancing the profession, is carried out through elevating the standards of admission and accreditation, and through various committee activities such as those of the Committee on Research to encourage the development of underlying theory, or that of the Committee on Career Counseling to encourage highly qualified young men to enter the profession. In addition the Society may be the medium for carrying out special studies, such as the current one on Education in Forestry and Related Fields of Natural Resource Conservation, which serve to guide the profession in the direction of higher levels of achievement.

The final question is: What are the advantages of a professional society? One might consider this question either from the standpoint of the public at large or from the standpoint of the individual member.

It seems to me that some advantage to the public must exist if professionalism is to succeed. In the absence of such public advantage there is little justification for the public sanctions which characterize the true profession. A public advantage appears to exist where (1) the service rendered by the profession can only be evaluated in the light of a sophisticated background of technical knowledge, and (2) where misuse or lack of such knowledge can do harm well beyond the scope of the immediate service. For example, incompetent design of a chair has much less sweeping consequences than the incompetent design of a bridge. A public advantage from professional status of engineers is thus much more apparent than that from similar status of a furniture designer.

Thus where the public generally cannot evaluate technical competence and where malpractice has broadly ramified consequences, the public at large gets vital benefits from the functions of a professional society. If it does not get such benefits the basis for a professional society probably does not exist.

To the individual, advantages may accrue because he is protected from unprofessional competition; he is protected from unethical competition from other professionals; and his personal prestige may be increased by the professional status of the organization. In the long run these advantages may well be reflected in the economic status of the individual professional man.

But even though these individual advantages are recognizable and tangible I doubt that the justification for a professional society should be based on what it can do for individual members. Too often it seems to me members ask: What does the Society of American Foresters do for me? This, I think, is the wrong question. A professional society provides a medium or a channel through which the individual can work more effectively to advance the profession. Unless most members look at the professional society in this light, rather than as a mere organization for service to membership, it may very well fail to achieve professional characteristics and objectives. The advantages to the individual from his professional society are long-term ones, and they will be realized primarily, not by the service the society renders the member, but by the efforts which members exert, through the society, in behalf of a strong and widely accepted image of the profession.

Minnesota Roadside Fire Prevention Campaign

Smokey Bear, national forest fire prevention figure, can be seen reminding motorists on Minnesota's major highways that they must cooperate in preventing fires. Keep Minnesota Green, Inc., leads a growing group of industries and public agencies in an annual statewide fire prevention campaign with Twin City Hoo-Hoo Club No. 12 and cooperating lumber yards providing the poles.

Industries provided 56 large luminous Keep Minnesota Green Smokey Bear signs that were erected in August with more donations expected, it was announced by Dr. Frank H. Kaufert, KMG president. An additional 44 signs will be put up later.

The scotchlighted signs are 8 feet high and 4 feet wide, showing Smokey with a tiny fawn and a squirrel, and the slogan, "Remember, Only You Can Prevent Forest Fires." Each is done in 7 colors, and they glow when struck by light from headlamps at night. The KMG seal and slogan "Keep Minnesota Green" are also displayed.

The Minnesota Division of Forestry, cooperating with the State Highway Department, erects these signs on highway rights-of-way in all parts of Minnesota.

The 56 signs were purchased at $90 each by firms and groups in the following categories: Forest products manufacturers, farm associations, flour millers, printing companies, public utilities, insurance firms, airlines, banks, mining companies, home builders, and oil companies.

A considerable reduction in the acreage destroyed by fires in Minnesota has come about during the 15 years since KMG was organized. The annual average loss for the 15-year period before 1944 was 260,000 acres. Since then the average yearly loss has dropped to 73,500 acres and has dipped as low as 9,000 acres.

Professionalism and Foresters' Licensing

W. B. DeVall

LICENSING of professional persons is not new. It is a time-honored procedure in such fields as medicine, law, and engineering. It is new in the profession of forestry, dating back only to 1951 in Georgia, 1955 in Michigan, and 1957 in Alabama.

Licensing within these professions and of forestry by these states carries the connotation of "permission given by law," in contrast to poetic license meaning "freedom from rules." Permission granted by state law places upon the profession licensed a keen sense of obligation and adherence to rules or a code of ethics. The code of the Society of American Foresters, consisting of 25 canons, sets forth rules of conduct for members of the profession. Within the realm of licensing, professional foresters become obligated to a code of conduct established by state law.

The Alabama State Board of Registration for Foresters has completed one calendar year of operation. It has encountered the normal problems of a new state body. It foresees several new problems, not previously encountered by Georgia and Michigan, since it operates in a state adjacent to one in which licensing of foresters is now in its ninth year.

Forestry in Alabama during the past two decades has achieved a position of primary importance as a profession and as a business. As it assumes the dual role in the eyes of the general public, professionalism in all forestry activities becomes a requisite to its future growth and development. The philosophies, concepts, and anticipated shortcomings, to be pointed out later, will serve to relate the need for development of a high level of professionalism in foresters to the still growing importance of forestry as a business. These must be companion processes, if the public is to gain confidence in the people who render service under such titles as forester, professional forester, or registered forester.

THE AUTHOR is head, Department of Forestry, Alabama Polytechnic Institute, and chairman, Alabama State Board of Registration for Foresters.

Accomplishments

The post-depression years of the 1930's saw forestry begin a two-decade period of development. One of the first activities was tree planting. Although tree seedlings were produced in the state's nursery as early as 1926, it was not until 1935 that the number of landowners planting trees exceeded 200. Tree planting thus became a land management practice. Timber was harvested from the farm woodlot either for on-farm construction use or for sale. New plants were built to convert wood into paper and other products. New markets brought higher prices. Loading points for pulpwood were decentralized and established at greater distances from the processing plant. This provided new sales areas for producers who previously had only a limited seasonal outlet for products of the forest.

The realization that the farmer and other small owners owned most of the forest land led to development of forest management service on these lands, provided by consulting foresters, industry, and government agencies. All of these developments, and many others, brought about a stronger public consciousness that forestry was growing up and had become a business. As a business, the landowner recognized the significance of profit. Maximum profit from these lands could be obtained only through practices based on professional scientific competence. The forester provided this know-how. Employment of more foresters in all phases of forestry in Alabama made professional and technical service more readily available to the landowners. As soon as the landowner realized that he could choose the person for this service, he sought the best qualified man. No measure or acceptable recognition of this competence was available except the title, forester. Thus the title "forester" and his forestry "practice" or "business" became more readily accepted by the general public. Legal recognition of professional competence is now made possible in the State of Alabama through licensing.

Just prior to and during the early part of the past two decades, several Alabama agencies, both state and federal, had initiated or were starting management programs of an applied nature on forest lands. Many landowners heard about the practice of forestry for the first time from personnel of the Alabama State Commission of Forestry, the Alabama Department of Conservation, the United States Forest Service, the Extension Service of the Alabama Polytechnic Institute, or the Tennessee Valley Authority.

Paralleling the growth of forestry as a business and profession over the past decade was the formal organization of several groups having a direct or related interest in forestry in general or in some specific area of forestry. Each was founded on the basic premise that development of a renewable, natural resource—the forest—would require the organized efforts of persons interested in forest lands, forest products, education, and re-

search. Forestry advanced at a much more rapid pace than would have been possible without this organized effort. Today Alabama has an accredited college curriculum in forestry and well established research centers. The Alabama Forestry Council has been a strong force behind many forestry accomplishments. The combined interests of land owner and processor have been coordinated by the Alabama Forest Products Association. Professional leadership has been provided by the Alabama Chapter, Southeastern Section, Society of American Foresters. Many other groups with forestry-related interests have contributed to this development through committees, individual participation, and voluntary leadership. Associations, operating regionally, have assisted Alabama in its forestry growth. Collectively, the people represented by these organizations have brought the profession of forestry and the business of forestry to its present status. The public is aware of this phenomenal growth. It recognizes the accomplishments of organized groups. It is now in position to expect professional treatment and service from foresters employed or working in the state. The professional status of these men must be preserved.

Registration of foresters in Alabama and licensing did not come about overnight or without effort. Initial leadership in the field of licensing of foresters in the United States may be attributed to Alabama. Studies were made of licensing in other professions and reports made at Section and National meetings of the Society of American Foresters by Alabama foresters. Although the first state to pass a licensing law was Georgia, much of the information compiled during these first studies formed the basis for this legislation.

Drafting of a bill to be submitted to a state legislative body must be preceded by a number of orderly steps. Existing laws in other states must be methodically studied. The basic provisions of the laws, as they affect people, must be routinely explained to all interested groups and openly discussed. Responsibility and initiative for these tasks must be vested in a working, professional group. Issues that arise out of lack of information must be forestalled. Time will be required for the steps just enumerated.

Before a registration bill is introduced in a state legislature, it should be sanctioned by the state forestry department or commission. Reasonable assurance that it has the approval of the governor is requisite to its introduction. A strong talking point in favor of registration legislation is the fact that the board appointed to administer the act will be self-supporting and not dependent on an appropriation from the state's general fund.

Support for a registration act should also be sought from organizations having a direct or related interest in professional forestry, only after the provisions of the bill have been thoroughly explained and the groups have had an opportunity to learn and understand the meaning of the law as stated in the bill. A bill should be studied by a legislative reference service and revised, if necessary, to comply legally with the constitution and code of the state. The bill should be introduced in the state's legislature by respected legislators. They should be assured that the bill has been endorsed by the leading forestry groups and that representatives of these organizations will volunteer to appear at hearings. A most important provision of a registration bill, in states that administer licensing through separate boards, is an authorization whereby a board may contract with another state agency to handle clerical and accounting duties. This arrangement is necessary because income from application and registration fees may not be sufficient to pay operating expenses of the board. The steps outlined will be found essential to enactment of legislation for licensing foresters. It will require a few years to bring about such action. Funds should be made available for printing review copies of the bill and its revisions. Money is also needed for mailing costs since copies must be placed in the hands of many people during the period preceding introduction of the bill in the state legislature.

Although many groups in Alabama spent much time working toward a satisfactory bill, the Alabama Chapter, Society of American Foresters was the group that ultimately assumed leadership and saw Act 533 passed by the Alabama Legislature, September 13, 1957. Alabama's experience may serve as an example for other states.

The chapter has continued its Registration Information committee. Its primary function is that of information and education among foresters qualified for registration. Although licensing can never be considered a "membership drive," those who enjoy the status of professional forester and are junior members or members of the Society of American Foresters may need to be encouraged to become registered as a further means of bringing about full professionalism for foresters.

The Alabama State Board of Registration for Foresters licensed its first registered forester May 28, 1958. Registrations have averaged 29 per month during the period May 1958 through January 1959. Two hundred eleven licenses have been issued to residents of Alabama. Licenses have also been issued to 49 out-of-state residents.

Accomplishments of licensing in Alabama can be measured not only factually but by public recognition. The Agricultural Extension Service has recognized the registered forester in its management program for forest landowners. Frequent requests are being received in the State Forester's office for information regarding the registered status of state employees who provide the public with service on forestry problems. The registered forester has been listed as

one approved for inspecting practices under the Agricultural Stabilization and Conservation program. An intangible measure of accomplishment is the degree to which forestry and foresters have been elevated professionally. Professional recognition and prestige for foresters have come at a time when the forestry resource of the state now provides an annual income in excess of all other agricultural commodities.[1] It is difficult to predict the significance that may be attached to professional forestry leadership in the future as Alabama enters its next two decades. It is safe to say that production goals announced in recent studies will require the best professional and technical forestry competence available. Professional forestry must develop along with technical forestry. The forester, therefore, should belong to his professional society and become registered in states where laws provide for licensing.

The Job Ahead

Complacency about the present favorable environment or the accomplishments of the past in building professional forestry should not lead to inactivity on the part of members of the profession and those concerned with licensing. There is tremendous opportunity for continuing an educational program that will reach the future college graduates in forestry, the future citizens that will make up the general public, and those now present among our ranks whose laxity in professional matters requires additional missionary work. The story of professionalism in forestry, as reflected by membership in our professional society and by registration, must repeatedly be told by both the verbal and printed word. All foresters must share in this task.

Recognition by the public of the full meaning of registration and licensing does not come quickly. It has taken considerable time in other professions. Recognition will become more universal in forestry as other states enact similar legislation. The speed with which this objective is reached will depend primarily on those within the ranks of the profession.

Each graduate forester, each member of the Society of American Foresters, and each registered forester has a unique opportunity to play a significant part in building professionalism in forestry. He has, or should have in his possession, certificates and a license verifying his status as a professional person. These credentials appropriately displayed on the walls of his office or place of business will speak for themselves when his public visits him. One has but to visit his lawyer, his dentist, or his doctor to realize from the credentials on the wall that the man whose services he seeks is a professional and licensed person. Foresters should be equally concerned about displaying their credentials.

The State Boards of Registration for Foresters in Alabama and Georgia have encountered some problems not heretofore experienced. Licensing of foresters in adjacent states has created certain problems regarding reciprocity. Clarification of the intent of the law relating to reciprocity is needed, since it may be interpreted differently by the attorneys general of the states concerned. This problem has been encountered in Alabama, although the wording of the reciprocity provision of the Alabama law is identical with that of the Georgia law. Present laws may have to be amended to clarify this issue. Other problems are anticipated as three, then four or more contiguous states pass registration legislation.

Each state board of registration for foresters is authorized by law to make by-laws and rules for the proper performance of its duties. Rules automatically become necessary for board operation. The three states with registration laws have found this to be true. Rules thus adopted by a board contain the interpretations it has made of certain portions of the law. Different interpretations of identically worded sections of existing registration laws in adjacent states point out another one of the problems to be faced in foresters' licensing.

Professional Responsibility

Registration and licensing of foresters place upon the applicant a legal responsibility. All information shown on the application form is given in the form of a sworn affidavit before a notary public. Inaccurate or false information so submitted, therefore, may subject the applicant to due process of law. An applicant for registration in Alabama also pledges himself to a code of ethics, if he is granted a license, that is set forth on the application form and below which his signature is notarized.

An applicant for registration must list on his application the names of five references none of whom can be members of the board. Three of the five must be professional foresters. Recommendations in behalf of applicants for registration are solicited by the board on a prescribed form. Instructions on the form place a firm responsibility on the honesty and integrity of the respondent. A portion of the request is quoted as follows: "The Board wishes to point out that the statements that you make will be taken as deliberate, and made with the full realization of the responsibility toward the public involved."

Information obtained from references is used by the board in its evaluation of professional competence, honesty, integrity, character, and reputation of the applicant.

Summary

The Alabama State Board of Registration for Foresters believes that registration and licensing of foresters will bring additional recognition by the public of the professional status of foresters, and prestige to the profession.

Experience with a state licensing law, gained by the Alabama Board, may prove valuable to other states

[1] *Advertiser-Journal*, Montgomery, Ala., November 23, 1958.

anticipating similar legislation.

Building professionalism through licensing is justified and necessary because of the economic development of forestry within the state.

Registration and licensing of foresters by the state points out a need for a continuing program of education within the profession and with the public to gain full recognition of the meaning of registration and the protection it offers to those concerned.

Legal problems develop as adjacent states begin administering registration laws. Solutions to these problems may require amendments to existing laws.

Registration laws are intended to protect the public. A professional responsibility therefore is placed on the licensee to render professional services in accordance with the code of ethics, violation of which is subject to due process of law.

There is a need for a national committee, working at the direction of the Council, Society of American Foresters, that would study licensing in all of its ramifications, looking toward the day in the not too distant future when more states will enact registration legislation. Special attention should be directed to the provision for reciprocity among states in the preparation of a "model" law that would provide a standard basis for licensing, and that would be available to states anticipating registration legislation.

Editor's note: The reader is referred to the Points of View and Society Affairs Sections of this issue for additional discussions of matters dealing with professionalism and licensing.

Comments on Regulation for Sustained Yield

The article by L. R. Grosenbaugh in the JOURNAL OF FORESTRY for October 1958[1] and the subsequent comments by W. H. Meyer in the March 1959[2] issue both contain a number of fundamental concepts involved in regulation for sustained yield. In each case the emphasis was placed upon the accurate and realistic interpretation of forest growth: one author handling it as a phenomenon of simple interest, the other regarding it as a process of compound interest. Of some little significance is the fact that while the basic philosophies of the two interpretations are different, the end results of the respective regulation formulations are surprisingly similar.

As a specific case in point, a management plan was recently completed for the Berea College Forest, a 4,400-acre institutional holding located in the Cumberland Mountains of eastern Kentucky. The basic inventory data indicated that the net sawtimber resource amounted to 28,195 M board feet (Int. ¼ inch Rule) of predominantly hardwood species. Annual growth for the forthcoming 10-year management period was set at 882.5 M board feet (assuming ingrowth to equal mortality). These data yield a simple growth rate of 3.01 percent and a compound growth rate of 2.7 percent. Following through with separate calculations we find that the allowable cut dictated by Grosenbaugh's simple interest formula exceeds that of the compound interest formulation by a mere 6 M board feet.

Unfortunately, the other ingredients of these two regulation formulas are not as easily manipulated as growth. The relative effects of employing simple or compound interest rates are completely overshadowed by the introduction of the elusive factors of growing stock level appraisal. Neither author saw fit to become involved in such matters—aside from setting up some synthetic standards for illustrative purposes.

Returning to the Berea College Forest for the moment, the rather arbitrary decision was made to maintain the current average level of growing stock (6,400 board feet per acre) during the initial period of management. In terms of the simple interest formula this permitted an annual allowable cut of 790 M board feet, or 784 M board feet following compound interest procedures. However, had the decision been made to increase the growing stock level to 7,400 board feet per acre by the end of the initial period, the allowable cut would have been reduced to 355 M board feet. Even the markedly conservative goal of obtaining 8,000 board feet per acre in 40 years, an increase of 400 board feet per 10-year period, would dictate an annual cut not to exceed 600 M board feet.

If such allowable cut formulas are ever to provide a meaningful basis for forest regulation, it is essential that development and definition of growing stock factors keep pace with the periodic refinements of growth appraisal. I suggest that future energies expended in defense of the simple or compound function of forest growth could be more profitably directed at considerations of desired stocking levels and associated adjustment periods.

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[1]Grosenbaugh, L. R. Allowable cut as a new function of growth and diagnostic tallies. Jour. Forestry 56:727-730. 1958.

[2]Meyer, Walter H. Comments on "Allowable cut as a new function of growth and diagnostic tallies." Jour. Forestry 57:210-211. 1959.

A Survey of Logging Residue in California by the "Two Stage" Method

Richard H. May
and Allan L. Hartong

IN DETERMINING the volume of timber cut on a given area, two components must be considered: (1) the output of timber products and (2) the volume of logging residue. Regardless of the standards developed for the inventory of timber volume, some timber usually remains in the woods as logging residue—from less than 1 percent to 50 percent or more of the timber volume cut.

Methods for determining annual timber products output in a state or subregion have been well established through numerous canvasses conducted by the Bureau of the Census and the U. S. Forest Service. Methods for determining volumes of logging residue have not been equally satisfactory. For example, some early methods measured logging residue on plots set up after logging was completed, but it was not always possible to determine what part of the residue came from live inventory volume, that is, from growing stock.

A logging residue survey in California in 1953 was designed to overcome this difficulty. This survey may provide some useful clues to foresters in other states planning similar surveys. This paper describes the two-stage method that was used and evaluates the results.

Description of the Method

The "two-stage" method of measuring logging residue requires: (1) the establishment and measurement of sample plots on going logging operations where timber has been felled and bucked but not yarded; (2) a return to the same plots after yarding for additional observation and measurement. At the time of establishment, the volume of felled trees and the extent of damage to the reserve stand due to felling are measured. Upon return after yarding, the material left and any additional damage to the reserve stand from yarding are measured.

Since the area cut over in 1953 was not known and the total volume of timber products output was known, or could be closely approximated, the sample residue volumes were expanded on the basis of volume rather than area. The estimate of total volume of logging residue was obtained by dividing the volume of logging residue on the plots by the volume of timber products removed from the plots, and applying this ratio to the total estimate of timber products output within the state. In California, the pine and redwood regions (Fig. 1)[1] were treated separately because of differences in topography, tree size and density, species composition, utilization standards, and logging practice.

Sampling Plan

A preliminary analysis indicated that for the accuracy required[2] a small sample might suffice. To complete the field work within the time available, it was decided to establish 30 plots. Since 92 percent of California's commercial timber cut is for sawlogs, and because veneer logs are usually, and pulplogs are frequently cut in the same operation as sawlogs, the plot distribution was determined by sawmill characteristics. To cover the state effectively, the 30 plots were proportionately distributed by size-class of sawmill receiving the logs, by forest region, and by broad ownership class (national forest and other) of land being logged. The logging operations on which the sample plots were to be measured were selected at random within each stratum. Two plots in the redwood region were ultimately discarded because early fall rains prevented obtaining complete data. The 28 plots completed were distributed as shown in Table 1.

All operations sampled produced sawlogs, and four (two in each region) also produced veneer logs. No logging for other products was observed on completed plots.

Trial runs at the Blacks Mountain Experimental Forest in the pine region and on a private operation in the redwood region suggested that the best plot size would be one acre for the pine region and one-half acre for the redwood region.

Procedure

Contacting the operator.—First, the names of 30 firms were drawn at random from a complete list of sawmills. These firms were notified in advance, and the survey crew visited the general manager of each to obtain permission to measure a plot on the company's logging operation. Cooperation was excellent. When a mill was shut down or otherwise failed to meet the sampling specifications as to size or source of logs, an alternate name was drawn from the list.

The general manager usually referred the crew to his woods boss,

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[1]The area shown here as the redwood region is the redwood—Douglas-fir subregion of the Forest Survey of California, and the rest of the state comprises the pine region. For convenience the two are termed simply redwood and pine.

[2]10 percent per billion cubic feet of timber cut (timber products output plus logging residue), at one standard deviation.

Large (25 MM bd ft & over)*
Medium (10-24 MM bd ft)*
Small (Under 10 MM bd ft)*
Regional boundary
*Annual production of sawmills receiving logs
REDWOOD REGION
PINE REGION

FIG. 1.—California, logging residue survey, 1953. Location of operations sampled.

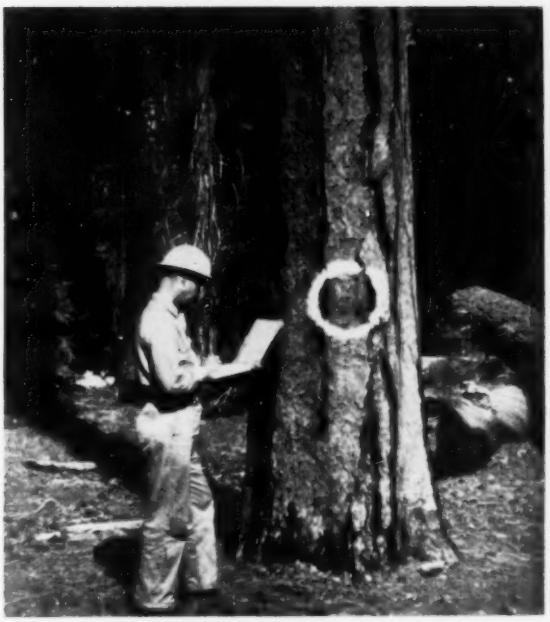

FIG. 2.—Trees similar to this 39 inch d.b.h. ponderosa pine along a road were paintmarked to identify them as plot takeoff points.

who in turn, directed the crew to the appropriate area for laying out the plot. This area had to be of sufficient size to lay out a square one- or one-half-acre plot in timber that had been felled and bucked and would be yarded in the next few days. It was essential that the area be so located that logging would not be impeded, and that the survey crew could work safely.

Plot location. — Wherever possible, a random bearing and distance were selected for chaining from the spar tree or loader at the landing to the plot center. Frequently, however, the only area meeting all requirements was so restricted that there was little chance of using random units.

To facilitate plot relocation, the takeoff points at the landings were liberally marked with doughnut-shaped insignia formed by spraying with aluminum paint (Fig. 2).

A square plot (Fig. 3) was laid out for convenience in marking the plot boundaries. Eight-ply white cotton string was used for this purpose, to divide the plot into quadrants for efficient tallying. After completing the initial measurements, the string was broken between every stake in order to disguise the plot's identity and minimize bias due to logging.

The plot center and corners were marked by small stakes topped with bright orange paint. Two stumps (or trees) near the plot center were used as reference points. These too were "doughnut-sprayed." Bearings and slope distances were measured to the plot centers from roofing nails in the bases of the stumps. Red flagging was fastened to the trees nearest the corners, and other trees in the vicinity were marked with paint.

The plots were oriented with the top and bottom parallel to slope contours and the two sides at right angles to the contours. In laying out the plots, the diagonals were usually run from the center to the corners with appropriate slope corrections in distances.

Plot measurements. — Logs and chunks were measured in accordance with the *National Forest Scaling Handbook*. Residual trees were plotted by d.b.h. and species. Information was recorded on four forms. The types of information shown on each of the forms were as follows:

a. *Plot description (Form 1).*— General information relating to the

TABLE 1.—NUMBER OF SAMPLE PLOTS MEASURED, BY REGION, OWNERSHIP CLASS, AND SIZE-CLASS OF SAWMILL, LOGGING RESIDUE SURVEY, CALIFORNIA, 1953

Size-class of sawmill receiving logs (Annual production)	Pine region		Redwood region	Entire state		
	National forest	Other	Other	National forest	Other	Total
	Number of sample plots					
Large (25.0 million bd.-ft. & more)	1	6	4	1	10	11
Medium (10.0-24.9 million bd.-ft.)	3	2	4	3	6	9
Small (Less than 10.0 million bd.-ft.)	0	4	4	0	8	8
Total	4	12	12	4	24	28

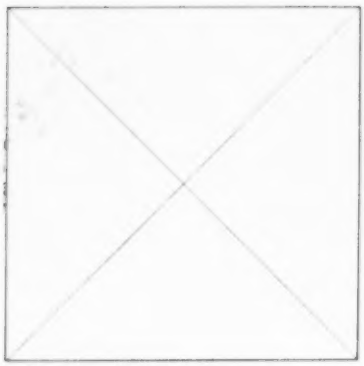

FIG. 3.—Square plot layout with lines indicating string placement.

plot. The form included space for a sketch showing the route from the nearest public road to the landing used as a starting point.

b. *Individual tree and log scale of trees felled and bucked (Form 2).*—Measurements of trees felled and bucked in logging, including trees felled but not bucked, and windfalls that were bucked. This form provided a record of all material that went into timber products from growing stock and the unutilized material removed from growing stock by felling. Supplementary information on material removed from nongrowing stock sources (cull and dead trees) was also obtained.

c. *Growing stock destroyed or damaged (Form 3).*—Measurements of trees eliminated from growing stock through damage or destruction caused by logging. Included here were trees destroyed by breaking (Fig. 4) or uprooting, and trees so badly damaged that they could no longer be considered as potential sawtimber trees.

d. *Sketch map of plot (Form 4).*—Showed the location of standing live trees, stumps of felled trees and other pertinent features. Data on reference points to the plot center were recorded in the space provided at the bottom of the sheet.

All stumps and all felled and bucked material were marked in a distinctive manner with lumber crayon and axe blazes as measured. Damaged and destroyed trees were marked with a bark scribe.

Before leaving the plot, the crew checked the forms for completeness, and checked the plot markings to be certain the plot could be identified upon return.

Plot remeasurements.—The plots were revisited after yarding, and checks made of the material originally recorded to determine whether it had been removed from the plot (Figs. 5 and 6). Appropriate entries were made on Form 2.

Growing stock damaged or destroyed by yarding was distinctively recorded on Form 3 to segregate it from material damaged or destroyed by falling or bucking.

A search was made for any marked logs left at the landing (Fig. 7), and those found were indicated on Form 2.

Results

Forest Survey inventory standards were used in computing the results. If other standards had been used the proportion of residue would have been different. Logging residue was 2 percent of timber products output from sawtimber in the pine region and 17 percent in the redwood region. The comparable figures for cubic-foot output from growing stock were 13 percent in the pine region and 33 percent in the redwood region (Table 2). It is assumed that similar residues result from logging operations other than sawlog.

FIG. 4.—This stub of a broken 16-inch d.b.h. ponderosa pine contained 120 bd.-ft., but was not salvaged.

By species, the board-measure logging residue in relation to timber products output was only 1 percent for ponderosa pine, sugar pine, and the true firs (white fir and California red fir) in the pine region. The percentage was much higher for incense-cedar, which, however, was lightly weighted in the average for the region. In the redwood region, the percentages were 6 for redwood and 23 for

FIG. 5.—Logging residue plot (foreground) at time of establishment before yarding. In red fir type.

FIG. 6.—Same plot as in Figure 5 after yarding. In the interval more timber had been cut in the distance.

Fig. 7.—This 16-ft., 14-in. ponderosa pine log and one of the smaller logs behind it were from one of the logging residue plots. They were left at the landing.

Douglas-fir. Grand fir, though high in percent residue, made up a relatively small part of the total (Table 3).

Logging residue by board measure was especially high for Douglas-fir in the redwood region. One reason is that the diameter of the actual utilized top was consistently larger than the volume table top-diameter used for Forest Survey inventory. Grand fir was also found to have an average utilized top larger than the volume table top. But the small amount of this species sampled and cut makes it relatively unimportant. Redwood and all pine region species were found to have actual utilized tops which were nearly identical to volume table tops. Since the logging residue study was made primarily to relate Forest Survey inventory to timber cut, it was imperative that the definitions and standards for timber cut and logging residue should coincide with those used for inventory volume. Based on actual utilized top, the estimate of logging residue for Douglas-fir in the redwood region would be 10 percent (board measure basis). A slump in the Douglas-fir market about the time this survey was made may have caused less complete utilization of this species than was the case during 1951 and 1952.

This example of Douglas-fir residue percentages brings out an important fact about all logging residue statistics. Their magnitude is partly determined by economic conditions. But they may also be affected a good deal by the standards chosen for the timber inventory.

Accuracy

The sampling error at one standard deviation, on a cubic foot basis, was 14.1 percent for the redwood region, 17.5 percent for the pine region, and 11.1 percent for the state. Since the total volume of logging residue in the state was 166,818,000 cubic feet, the sampling error was 4.6 percent per billion cubic feet. This is well within the 10 percent per billion required accuracy.

Control of nonsampling errors was considered satisfactory in the pine region. In the redwood region, however, errors in field measurement could be of considerable magnitude. Large volumes of wood and debris, dense underbrush, and rough topography often made accurate measurements physically impossible (Fig. 8). In steep country, felled trees and bucked logs often slide a long way down slope. Even before yarding, the arrangement of logs sometimes permitted only rough estimates of their volumes. Furthermore, skid-trail construction sometimes buried merchantable logs. A better method of estimating logging residue will be required to overcome these obstacles.

Evaluation of the Method

The "two stage" method of measuring logging residue requires relatively few plots to obtain the accuracy required. However, the necessity of returning to the plots for remeasurement and the relatively elaborate installation increase the cost of the job.

It was always possible to mentally reconstruct the tree. From the appearance of the bucked logs and their cull percent, we could determine whether they had come from a growing stock tree, a cull tree, or a dead tree.

On some plots in the redwood region, we could not be sure that all logs gone from the plot at the second inspection had been removed for timber products use. In the pine region the disposition of plot logs was more easily ascertained.

One disadvantage of this method is that detection of cull is often inadequate, particularly in the redwood region where defect may run as high as 20 to 30 percent of gross volume. Here the ends of logs were often tightly together. The ends of pine region logs were more often discernible. Since the residue percents are based on net volumes, and since logs taken from the woods tend to have less defect than logs left behind, incomplete cull infor-

Table 2.—Logging Residue as Percent of Timber Products Output, By Region and Class of Timber, California, 1953

Class of timber	Pine region	Redwood region
Sawlog, board measure	2	17
Growing stock, cubic measure		
Sawtimber	12	32
Pole timber	1	1
Total	13	33

Table 3.—Logging Residue As Percent of Timber Products Output, by Region and Species, California, 1953

Species	Board measure		Cubic measure	
	Pine region	Redwood region	Pine region	Redwood region
	Percent			
Ponderosa pine	1	—	12	—
Sugar pine	1	—	9	—
Redwood	—	6	—	19
Douglas-fir	2	23	11	36
True firs	1	34[1]	10	45[1]
Incense-cedar	21[2]	—	57[2]	—
All species	2	17	13	33

[1]Grand fir comprised only 3 percent of total timber products output for the redwood region.

[2]Incense cedar comprised only 4 percent of total timber products output for the pine region.

FIG. 8.—This scene from a redwood logging operation in Sonoma County illustrates some of the problems of accurately measuring logging residue in the redwood region. (The logs have been barked and are slippery.)

mation could result in an underestimate of percent of logging residue. The logging residue can be closely inspected upon the second visit to the plots, so measurements of residue net volume are more accurate than those for timber products output.

The "two stage" method is not practical to use when logging is done in more than one setting because, for accurate results, a return for inspection and measurement should be made between each setting. Such return trips could become very costly. Also, this method requires the location of plots in an area that will be completely logged before the end of the season. Otherwise the full number of sample plots desired may not be obtained.

The specification of one-acre plots in the pine region should perhaps be relaxed to permit plots of any fractional acre of one-fifth or more. Several operations could not be sampled because they did not have a square acre of felled and bucked timber between the falling crews and the yarding tractors. In such cases an alternate operation was selected. If smaller areas are chosen, the data should be expanded to a per-acre basis, for uniformity.

Conclusions

The "two stage" method of measuring logging residue proved satisfactory in the California pine region. With some improvement in technique and tightening of procedure, this method would be very effective, permitting the necessary information to be obtained with adequate accuracy at a reasonable cost. It should be usable in any region where areas being logged are not steep and where the timber is relatively free from defect.

In the California redwood region, however, the "two stage" method cannot be regarded as a success. It would probably not be successful in any region where logging is done on steep slopes, or in highly defective timber. An effective method, at reasonable cost, should be developed for such areas.

Correction

The Point of View, "Comments on Professional and Subprofessional Strata Within the Field of Forestry," appearing on page 669 of the September issue of the JOURNAL was written by Ted W. Nelson of Lyman Springs, Calif., and *not* by Ted W. Lyman. Our apologies to Mr. Nelson for this typographical slip.

Multiple Land Use on the Salt River Watershed, Arizona

Charles F. Cooper

NEARLY half a million people make their home in the city of Phoenix, Arizona, and the surrounding Salt River Valley. The phenomenal growth of this region has been made possible largely by the availability in the desert of water for agriculture, industry, and homes. The needs of an expanding population must be supplied by water originating outside the immediate area of use. Much of the water used in the Phoenix area is drawn from accumulated ground water storage of ages past. As the ground water reserve has been depleted, the community has become increasingly dependent upon current increments of surface water from the Salt River. Directly and indirectly, the Salt River now contributes about two-thirds of the annual water requirements of the Phoenix area; unless new sources are developed soon, this proportion must increase as time goes on.

Four miles below the confluence of the Salt River and its major tributary, the Verde, is Granite Reef Diversion Dam. This dam diverts essentially the entire flow of the river system for use in the Phoenix area. The source of the water reaching Granite Reef is the drainage basin of the Salt River —the Salt River watershed. Almost entirely uncultivated mountain and foothill land, this drainage basin yields not only water but timber, grazing, wildlife, and recreation.

"Multiple use" has become a popular catchword in the management of natural resources, but on the Salt River it is more than a catchword. Here, as sharply as anywhere in the nation, each of the major land uses competes with all the others on the same acre. The Salt River watershed is an important pilot area for the resolution of the inevitable conflicts inherent in multiple use management. Timber, grazing, water, recreation, and wildlife—each can be produced from the same acre, but not each in maximum quantity. Determination of the priority of resource allocation is a major task of future managers of wild lands, not only on the Salt River but in other river basins throughout the West. A knowledge of present land use patterns may help in setting future management goals. This study of land use on the Salt River watershed was greatly aided by Dr. R. R. Humphrey, professor of range management, University of Arizona, to whom I am indebted for a critical review of the manuscript.

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Topography and Climate

The Salt River watershed comprises more than 12,500 square miles lying diagonally across Arizona. In elevation, it rises from 1,325 feet at Granite Reef to more than 12,500 feet on the highest mountains. On the north the basin is bounded for most of its length by the steep escarpment of the Mogollon Rim, while to the south a series of more or less isolated ranges separates it from the Gila River drainage. A small portion of the high San Francisco peaks, near Flagstaff, is drained by the Salt River system, but the main mountain mass within the watershed is the White Mountains in eastern Arizona.

The great range in elevation induces a similar range in climate. Winters in the high mountains are long and cold, with abundant snowfall, and summers are short and cool. In the desert, summer temperatures often reach 115°F., and winters are likewise warm.

The best estimate of precipitation within the Salt River basin is that of Hiatt (*7*). According to his isohyetal map, mean annual precipitation ranges from about 36 inches in the wettest portion to 8 inches near the valley floor. Data by planimeter indicate that about 1.2 percent of the watershed receives over 32 inches a year, while more than three-fourths gets less than 24 inches. Average precipitation on the entire watershed above Granite Reef is about 20.4 inches annually (*1*).

Vegetation

The upper slopes of the White Mountains and the San Francisco Mountains are covered with a dense forest of Engelmann spruce (*Picea engelmanni*) and corkbark fir (*Abies lasiocarpa* var. *arizonica*). At a slightly lower elevation white fir (*Abies concolor*) and Douglas-fir (*Pseudotsuga menziesii*) become more important. Ringing the spruce-fir zone at its lower margin is an irregular band of aspen (*Populus tremuloides*), which seems to have originated following a series of severe fires that wiped out an older coniferous forest.

Below about 8,500 feet a broad band of ponderosa pine (*Pinus ponderosa*) mantles the mountain and plateau country down to about 6,500 feet. Average annual precipitation in the pine zone is from about 18 to 28 inches. At its upper limits, ponderosa pine grows mixed with aspen, white fir, and Douglas-fir; in the intermediate areas it occurs in almost pure stands. At the lower, drier, limits of the zone, pines of poor form and little commercial value are associated with several species of juniper. Open

grass parks, and wet meadows or "cienegas" are interspersed at intervals throughout the forest.

The ponderosa pine forest is typically much more open than the spruce-fir forest that lies above it. The mature trees are generally widely spaced, with a good cover of grass in the intervals between. It is evident, however, from early records, from tales of "old-timers" in the area, and from a study of stand structure, that the pine forest is much less open and park-like than when it was seen by the first settlers some eighty years ago (*5*). Conspicuous throughout the area today are thickets of pine reproduction, some so dense they are difficult to walk through (Fig. 1). Most of these thickets originated in 1919, as the result of a sequence of years favorable for the establishment of pine seedlings, but some date from other years. A heavy layer of needles, branches, and other litter carpets the forest floor, and grass is less abundant than in times past.

These changes seem to be largely attributable to the fire-prevention program which has kept most fires out of the woods in the Southwest since about 1900. The evidence is conclusive that natural ground fires, started by lightning or by Indians, swept through the pine forest at three to ten year intervals as far back as we can read the rings of the oldest trees (*13*). These fires apparently acted to thin the young pine stands, to maintain the open nature of the forest, to reduce fuel accumulation, and to maintain desirable conditions for grass growth. The effects of changes induced by exclusion of fire on timber growth and on the hydrology of the river basin are still in controversy.

Immediately below the ponderosa pine zone is a pinyon-juniper woodland, ranging in elevation from about 4,500 to 6,500 feet. Estimated annual precipitation is 12 to 18 inches. The woodland consists of several species of juniper, including alligator juniper (*Juniperus deppeana*), Utah juniper (*J. osteosperma*), and one-seed juniper (*J. monosperma*), with a sprinkling of pinyon pine (*Pinus edulis*) at the higher elevations. Where the junipers are not too dense, there is a good cover of grass, usually dominated by blue grama (*Bouteloua gracilis*), between the trees. Open desert grasslands border the woodland on its lower margins, and grass parks are numerous within it. Due at least in part to restriction of natural fires, juniper has spread in recent years into former grasslands and has thickened in density in stands where it has long been dominant. With little protective herbaceous cover remaining in the intervals between the trees, erosion is often severe in dense woodlands.

In some parts of the watershed, at about the same elevation as the pinyon-juniper type, there is a mixed chaparral type composed of evergreen shrubs such as scrub oak (*Quercus turbinella*). The lowest elevations of the watershed are occupied by desert shrub vegetation dominated by widely-spaced shrubs and small trees, including mesquite (*Prosopsis juliflora*), creosote bush (*Larrea tridentata*), and palo verde (*Cercidium microphyllum*).

No accurate vegetation survey of the watershed has been made, but most of the area was covered by reconnaissance range surveys between 1916 and 1939. These surveys show in a general way the vegetation as it existed at the time of the examination. In some places these data have been supplemented by more recent and comprehensive timber surveys. Data from these sources have been combined into a vegetation map of the Salt River watershed (Fig. 2).

At the time of the surveys the pinyon-juniper woodland covered about 28 percent of the watershed, but the recent spread of juniper has probably increased this area at the expense of the grassland. Grasslands cover about 19 percent of the area; the various brush and shrub types about 30 percent. Most of the remainder is forest: 20 percent ponderosa pine, 1.6 percent spruce-fir, and 0.5 percent aspen. The small area of cultivated land makes up the balance of about 0.4 percent.

FIG. 1.—A typical thicket of 38-year-old ponderosa pine on the Fort Apache Indian Reservation. In the densest portion of this stand there are the equivalent of 10,000 stems per acre or more.

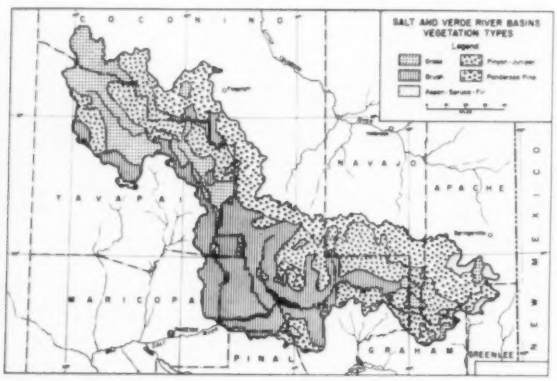

FIG. 2.—Major vegetation types on the Salt River watershed.

Population and Land Ownership

Prescott, in the extreme southwest corner, is the largest city in the basin, with a 1950 population of 6,764. Miami, Globe, and associated mining towns lie barely within the watershed in the extreme southeast corner. About 4,000 Apache Indians make their homes on reservations within the area. The resident population on the rest of the watershed probably does not exceed 10,000.

Most of the watershed is in some form of public ownership or control. Indian reservations, chiefly the Fort Apache and San Carlos Reservations in the White Mountains, occupy about 25 percent of the area. The U. S. Forest Service controls virtually all of the forest land outside the Indian reservation, and much of the woodland and shrub zones as well. National forests comprise about 62 percent of the total area, while other federal agencies such as the National Park Service and Department of Defense administer less than one percent. The remaining 12 percent is private land, and state land leased to private operators.

The privately controlled land is used chiefly for livestock grazing; only about 32,000 acres are cultivated. Practically all agriculture in the basin is carried out under irrigation, most of it around the town of Camp Verde. Mining was formerly a major industry; the ghost town of Jerome was once one of the copper centers of the world. Commercial mining within the Salt River drainage is no longer important, however.

Water

The waters of the Salt River are as completely developed as those of any other major stream in the United States. Four dams on the Salt and two on the Verde provide storage capacity that has been sufficient to absorb the maximum flow of the river every year since 1941, when surplus water last spilled from the reservoirs.

During the period of 1914 to 1953, an average of about 1,240,000 acre-feet of water per year entered the irrigation reservoirs of the Salt and Verde Rivers (*1*). This is equivalent to an average depth of runoff of about 2.1 inches from the area above the gaging stations, or about 10 percent of the annual precipitation. The greatest per acre water yield is derived from the spruce-fir forest zone, perhaps as much as 12 to 15 inches per year. Other high-yielding zones are the aspen type and the subalpine grasslands of the White Mountains. Although these high-altitude vegetation types occupy less than 2.5 percent of the watershed, they contribute 20 percent or more of the annual stream flow.

The largest single contributor of water to the Salt River system is the ponderosa pine zone. Average runoff here probably does not exceed four inches, but the large area of ponderosa pine forest makes it in the aggregate the source of nearly half of the total annual stream flow. Smaller amounts of runoff originate in the pinyon-juniper and chaparral—probably no more than one-half to one inch. Their large area, however, makes them significant water sources. Little or no water is apparently contributed to streams by the other vegetation types on the watershed.

Considerable concern has been expressed over the apparent decline in stream flow in recent years. Anderson (*1*) showed that stream flow for the period 1931-1953 was only 84 percent of the long-term average. His detailed analysis of precipitation-stream flow relationships indicated that the basic cause for the prevailing below average stream flow has been the generally lower precipitation since 1932. There is some evidence, however, that the changes which have taken place in the vegetation of the watershed in the past half century—the invasion of grasslands by shrubs and trees, the increasing density of trees in forest and woodland, and the depletion of the grass cover—may have had detrimental effects on water yields. Increased transpiration by an increased volume of vegetation, and the interception of a greater proportion of snow and rain by more abundant woody vegetation, may have resulted in a smaller residual of soil moisture available for stream flow. An active research program is being carried on by the U. S. Forest Service, in cooperation with the State of Arizona, to develop effective land treatment techniques for increasing water production, while maintaining high quality of water.

The value to the regional economy of the 1,240,000 acre-feet of water delivered each year by the Salt River has never been adequately determined. The charge to farmers made by irrigation districts is a service cost incident to delivery of water at the headgate, and does not represent the value of the water itself. A value has sometimes been assigned to water based on the difference in selling price between irrigated and non-irrigated land, on the assumption that the higher cost of irrigated land is due solely to the availability of water. A modification of this method, used by the U. S. Forest Service in appraising a tract of forested land in Arizona (*11*), indicated that each acre-foot of water was worth $14.43 at the point of origin.

Barr (*2*) made a careful analysis of the value of pumped water in the Salt River Valley, on the assumption that an additional acre-foot of water that might be yielded by the watershed has the same value as an acre-foot of pumped water. He estimated that each acre-foot of pump water measured out to farmers is worth $13.70. This value includes not only the costs of pumping and delivery but also a charge for the lowering of the ground water table and the eventual depletion of the water resource. Taking into account losses in delivery, each acre-foot of water passing Granite Reef Dam has a calculated value of $9.13. The use of water for development of hydroelectric power increases its value per acre-foot above the power dams, but losses due to evaporation and seepage act in the opposite direction. Barr estimated that water on the water-

shed at the nearest live stream below the point of origin is worth about $8.00 per acre-foot on the Verde River and $9.50 on the Salt. He suggested that these are minimum values and may be subject to upward correction as a result of further study.

The total value of all the agricultural crops irrigated by the water of the Salt River, as estimated from the records of the Salt River Valley Water Users' Association, is about $57,600,000 per year. Not all this production is the result of surface water from the Salt river, however. Approximately 35 percent of the water used for irrigation on the Salt River project comes from pumps. Some of this is percolating water that had its ultimate source on the upper watershed. Much pump water, however, represents depletion of the ground water reserve and inflow from areas below Granite Reef Dam. In addition, a small amount of rainfall is available each year to assist in crop production. Taking all these factors into account, it seems reasonable to assume that about 65 percent of the crop production in the Salt River Valley is produced by runoff from the Salt River watershed. This means that river water irrigates crops each year worth about $37,400,000. In addition, at least 30 percent of the annual water delivery is used for domestic and industrial purposes and for lawn and garden irrigation in the Phoenix area. It is difficult to place a value on the latter uses, which produce little directly measurable return but which make the Salt River Valley communities more desirable places in which to live.

Water development in the arid Southwest has been largely devoted to the expansion of agriculture. Arizona ranks as one of the major cotton-producing states, and has consistently led the states in per-acre cotton yields. Truck crops and such specialties as sugar beet seed are other important sources of agricultural income. Koenig (*8*) has suggested, however, that irrigation of the arid lands of the twentieth century is no longer an appropriate use of that valuable resource, water. He indicates that arid lands can provide full employment and a high standard of living only if their scarce water resources are devoted to industry, not agriculture. Agricultural products in a future economy must be shipped in from more humid regions, while the limited water is used in ways that will support a greater number of people. This process is already under way. Newspaper publicity about the advantages of Phoenix as a winter resort has tended to obscure the fast growth of light industry which is rapidly making the Salt River Valley a major manufacturing center. The growth of industry and of population has substantially reduced the area of agricultural land in the Valley in recent years. Although there are many who contend that population expansion should not be encouraged in a region of limited resources, the attractiveness of the Salt River Valley as a place to live apparently makes its continued growth inevitable.

Timber

There are more than 6,500 million board feet of ponderosa pine and 1,500 million board feet of other species on the Salt River watershed. A comparison with statistics compiled by the U. S. Forest Service for the entire state (*12*) shows that almost one-half of Arizona's timber area and about 40 percent of the timber volume lie in the drainage of the Salt River. The great bulk of the commercial timber is ponderosa pine; only a negligible volume of other species is cut each year. More than 40 percent of the pine timber grows on only 17 percent of the forest area. Those sites classed as poor and non-commercial comprise almost 45 percent of the timbered area, but together support only about 18 percent of the timber volume.

As a part of its timber management program, the U. S. Forest Service conducts growth studies on timber sale areas throughout the pine zone. Sample plots in cutover tracts in each management block are measured at regular intervals. Data from growth plots within the Salt River portion of the Coconino National Forest indicate that present timber growth on that forest is about 96 board feet per acre per year. The best timber sites no doubt yield considerably more than this, while the poorest produce much less. An annual growth rate of 150 board feet per acre is attainable in ponderosa pine stands of average quality (*9*), but realization of this potential requires an intensive program of thinning, pruning, and frequent light cuts of sawtimber, not practical under present economic conditions.

The net return from timber can be determined from the gross stumpage value of annual growth less costs of growing and selling the timber. At 1956 prices, the estimated net return from timber growth on average sites in the Salt River watershed is about $6.50 per thousand board feet, while the higher quality timber growing on the best sites is worth about $10.80 per thousand. Taking into account the variations in stumpage value and in annual growth per acre, the net annual return from timber growth appears to range from about $1.60 per acre on the best ponderosa pine sites to no more than $0.40 per acre on the poorer timber growing areas (*3*).

Timber harvest in the spruce-fir type has so far been limited to a few small sales, although operations in this high mountain zone are being stepped up. Few data are available to establish growth rates or values of spruce and fir timber. These species are in low demand compared with pine, and the cold climate of the high mountains produces a slow-growing forest. Taking all these factors into account, it is doubtful if timber returns on even the best of the spruce-fir sites will exceed those of the lower-producing pine areas. Aspen is used to a limited extent for excelsior wood, but has no other commercial value at present in the region.

The wholesale value of all finished lumber cut from the Salt

River watershed could be calculated from data on current lumber sales. However, present timber harvest practices are designed to bring the virgin forest under management, and the present cut probably somewhat exceeds annual growth. An annual growth rate of 96 board feet per acre from the 1,545,000 acres of commercial forest will yield 148,320,000 board-feet per year. The 1956 weighted average price f.o.b. mill for all grades of finished lumber in Arizona was $78.00 per M bd. ft. At this price, annual timber growth on the Salt River watershed is worth about $11,600,000 in the form of finished lumber.

Grazing

Practically all of the Salt River drainage is grazed by domestic livestock, chiefly cattle, for at least a part of the year. During 1955, the Salt River watershed provided approximately 1,100,000 animal-unit months of grazing. Many years of stocking adjustment have presumably brought livestock numbers fairly well into line with the present carrying capacity of the range. The continued increase of woody non-forage plants on the range, however, is bringing about a steady decline in carrying capacity. If present trends continue, the deterioration of the range can be expected to progress at an increasing rate. An average of about 7.2 acres of range land is now required on this watershed to support one cow for a month. According to experienced range technicians, carrying capacity varies from 20 acres or more per AUM (animal unit month) in the spruce-fir forest to no more than 2 acres per AUM in the best subalpine grasslands. The ponderosa pine type requires on the average about 6 acres per AUM; the pinyon-juniper type, about 8 acres.

Data from ranch sales, grazing fee studies, and range land leases indicate that the value of one animal-unit month of grazing on the Salt River watershed is approximately 60 cents. The net annual return from grazing varies from about one cent per acre in the spruce-fir forest to 10 cents in the ponderosa pine type and more than 30 cents per acre in the subalpine grassland. The present average net land return from grazing, after deducting costs of fire protection, administration, and the like, is estimated to be about 6½ cents per acre per year on the watershed as a whole (*4*).

Reports are available on the value of all livestock in Arizona, but there is no direct way to determine the proportion produced within the Salt River drainage. A rough estimate can be obtained by considering that the 1,100,000 AUM's of seasonal use provided by watershed lands is nearly equivalent to 92,000 cattle on the range yearlong. This hypothetical herd might be expected to produce about 65 percent calf crop. A recent study of Southwestern cattle ranches has shown that the average market weight of calves for the past fifteen years has been about 365 pounds (*6*). Assuming a 65 percent calf crop from 92,000 head, 365-pound calves, and cattle prices at the 1952-1955 level, annual livestock production on the Salt River watershed is valued at about $4,200,000.

Recreation and Wildlife

More than a million people each year visit some portion of the Salt River watershed primarily for recreational enjoyment (*10*). About 40 percent of the visits are to established picnic areas. Additional thousands of weekend motorists drive through the forests and the deserts purely to enjoy the scenery. A smaller proportion of visitors are hikers and campers who spend more than one day in the area.

Hunting draws still others to the watershed. Deer are probably the most widely distributed and sought after animal, but elk, bear, antelope, javelina, squirrels, and rabbits are also hunted. Such birds as quail, doves, wild turkey, ducks, and geese provide sport in season. Most of the watershed is included in special management units, in which controlled hunts, habitat improvement, and other activities are carried out to enhance hunting values.

Arizona's relatively few good trout streams are mostly high tributaries of the Salt River. A few creeks in the Mogollon Rim country around Oak Creek, and the region at the head of the Black and White Rivers in the White Mountains receive heavy fishing pressure. Much of the trout fishing in the more accessible waters is on a put-and-take basis, with catchable trout planted from artificial rearing stations. At lower elevations, some of the West's best warm-water fishing, for bass, crappie, and other species, can be found in the storage reservoirs on the Salt and Verde Rivers. Boating and water-skiing are becoming increasingly popular on the Salt River lakes.

Several wilderness and primitive areas have been established to preserve a small portion of the wild land as nearly as possible in its natural state, with a minimum of interference or improvement by man. Hiking and horseback trips into these wildernesses are encouraged, but mechanized travel is not permitted. Less than one percent of all recreational visits to the watershed include wilderness trips, but wilderness preservation serves a recreational and esthetic need all out of proportion to the number of people who actively use the areas.

In Arizona as elsewhere, recreational use and recreational demands are rapidly increasing as population grows, as people have more leisure time, and as transportation improves. Many people, rightly or wrongly, now consider recreation the dominant use of the wild lands of most of the West. The public is becoming increasingly vocal in its demands that land management not interfere unduly with recreational opportunities.

The Future of the Salt River Watershed

The significance of the water yield of the Salt River watershed is the most striking fact that emerges from a consideration of the relative importance of the va-

rious uses of the land. Admittedly, many of the figures presented in the foregoing sections are rough estimates only, but the comparative values are sufficiently reliable to indicate an order of magnitude and to indicate the relative importance of each of the major land uses. It is apparent that water is the primary product of the wild lands of the Salt River watershed, not only in economic value but in number of people served. Recreation is perhaps second to water in importance to the overall welfare of the people of Arizona. Timber production ranks third, with grazing of livestock the least important economically of the major land uses. National economic trends indicate that this ranking will be maintained into the foreseeable future.

The Salt River watershed is an area in transition—passing from the old days of extensive management to a new era of intensive management. Today, the demand for each of the products of the land has become so intense that detailed adjustments and allocations of resources among conflicting demands must be made if the watershed is to be of maximum value to the people of Arizona and the nation.

Intensive management does not mean that the entire watershed must be cut, plowed, covered with roads, and otherwise converted into a semi-urban countryside. Rather, it means direction of effort toward maximum production of timber from the most valuable forest areas, greatest water yield from the primary water source areas, and provision of maximum recreational opportunities for individuals of varying tastes. The promised development of plants and animals better adapted to arid conditions, expensive schemes for the importation of water from distant sources, eventual modification of the weather—all these will help to alleviate the water problem of the Salt River Valley, but the primary source of water in the desert, in the future as in the past, will be the watershed of the Salt River.

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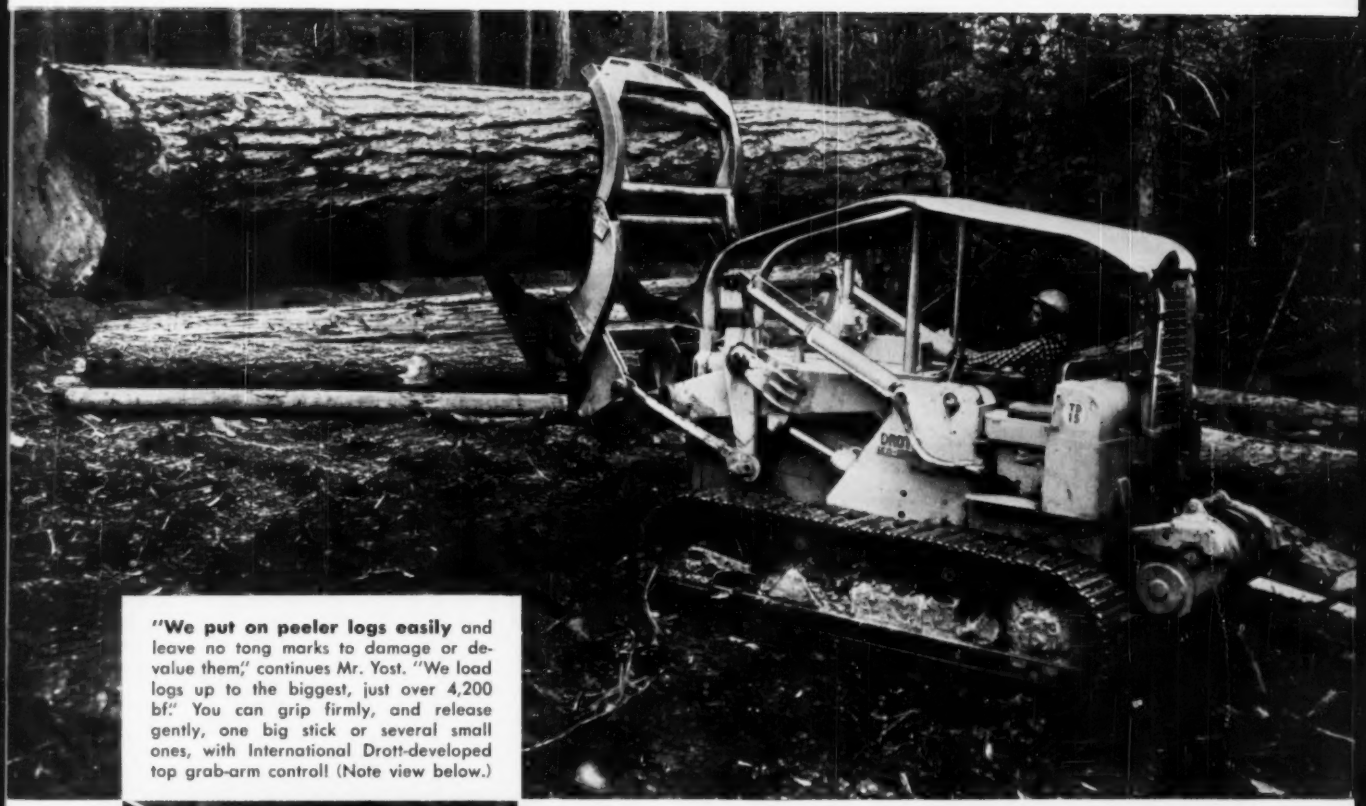

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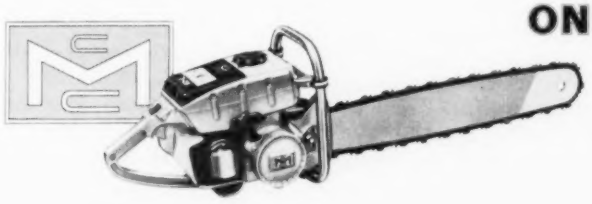

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Airplane Application of Herbicides for Releasing Conifers[1]

John L. Arend

AIRCRAFT have many uses in forestry operations. They are used for detection and suppression work in connection with fire, insect, and disease problems as well as for mapping and transportation.

The application of herbicides by aircraft for timber stand improvement by freeing conifers from undesirable hardwoods and brush is a relatively new technique in forestry operations. The development and use of silvicide spraying by aircraft for these purposes are described in this paper.

Background and Development

The development in the mid-Forties of "selective," "systemic," or "synthetic hormone" type herbicides such as 2,4-D and 2,4,5-T started a new era in weed and brush control. For the first time an organic chemical (carbon, hydrogen, oxygen, and chlorine) was synthesized that was toxic to some plants and not to others and was effective in relatively small quantities (1 to 2 pounds per acre). This development made it possible to consider light foliage spray applications of 2,4-D or 2,4,5-T for control of most broadleaf plants without damage to conifers.

The use of aircraft to apply selective herbicides for conifer release in forestry operations was developed through a series of field trials. Reports of this development are available in existing publications.

In 1948 (*11*) and 1949 (*6, 7*) results were reported on the application of 2,4-D and 2,4,5-T by aircraft in Oklahoma and Texas for controlling sage brush and scrub oak for range and pasture improvement. In these trials selectivity of the herbicide at relatively low rates and its effectiveness in low spray volumes (5 gallons per acre) were established.

About this time, 1950, foresters began to think more seriously about the same method for the release of conifers.

In 1950 the effects of 2,4-D and 2,4,5-T on conifers were relatively unknown, and this lack of information delayed the use of aerial application of herbicides solely for conifer release. Although it was not until 1954 (*1*) that a specific study was made of the effects of foliage sprays of 2,4-D and 2,4,5-T on conifers, some information was obtained from spray operations made with ground equipment for brush control where conifers were present.

In such operations for brush control on utility and roadside rights-of-way, it was early observed that 2,4-D and 2,4,5-T were not very effective on conifers. The foliage of conifers could be browned and damaged, but rarely were the larger trees killed. Lack of conifer kill with foliage sprays was considered to be a limitation on these selective herbicides for utility right-of-way maintenance. The damage often suffered by conifers from foliage sprays set back the use of selective herbicides for release purposes. However, it was also observed that conifers were more resistant to 2, 4-D and 2,4,5-T during the later part of the growing season than in the spring.

During the years 1950-1952 a few pioneer tests were made with aircraft to apply selective herbicides

THE AUTHOR is Research Center leader at the East Lansing, Michigan field unit, which is maintained in cooperation with Michigan State University by the Lake States Forest Expt. Sta., Forest Service, U. S. Department of Agriculture.

[1]Talk presented at Agricultural Aviation Research Conference, Milwaukee, Wis., November 11, 1958.

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for release of conifers. The first results published of these early trials were by Carl Hawkes in 1953 (*9*). He reported on a spray operation applied by aircraft during June and July 1951 in Oregon to free Sitka spruce, Douglas-fir, and Port-Orford-cedar (2-8 feet tall) growing under alder and willow (10-20 feet tall). The spray consisted of 2 pounds acid equivalent of the ester of 2,4-D mixed with 8 gallons of water per acre. Another mixture, using a carrier of 7 gallons water and 1 gallon diesel oil, was also used with equal effectiveness. The treatment was applied on 1,000 acres at a total cost of $5.15 per acre. The alder and willow, whose tops are easily killed by 2,4-D, were defoliated by this treatment. The leaders of the conifers under the alder curled down but straightened by August. Exposed conifers suffered leader and branch-tip damage. This particular test demonstrated the economy of applying herbicides by aircraft for conifer release, but the damage suffered by the conifers showed that more needed to be learned before airplane spraying of herbicides could be recommended generally for release purposes.

The next report published on conifer release by aircraft application of herbicides was by Ralston and Coulter in 1954 (*12*). They described tests made in August 1952 in Lower Michigan. About 20 acres of oak ranging from 10 to 50 feet in height with underplanted red pine 4 to 8 feet tall were sprayed with the ester of 2,4,5-T at two rates of application: (1) 1 pound of 2,4,5-T acid equivalent in 1 gallon of diesel oil and 3.75 gallons of water per acre, and (2) 2 pounds of 2,4,5-T in 1 gallon diesel oil and 3.50 gallons of water per acre. The results of this small-scale aerial spray application of herbicide for pine release were spectacular. Over 90 percent of the oak were killed with no subsequent sprouting, and the pine was undamaged even in the openings. The test conclusively demonstrated the successful use of aircraft for applying herbicides to release red pine from oak, both from the standpoint of release effects and economy of the operation.

In July 1953 a regional field meeting was held in Lower Michigan for foresters interested in chemical brush control work. The results of the aerial spray treatment for pine release were so convincing that the National Forests of the Lake States made immediate plans to spray about 900 acres of conifer plantations for release purposes, using 2½ gallons of spray per acre. About 500 acres of scrub oak suppressing red pine in Lower Michigan, 250 acres of aspen and red maple overtopping red pine in Upper Michigan, and 150 acres of aspen and paper birch overtopping red pine and white spruce in northern Minnesota were sprayed in early August of the same year. The hardwood control for conifer release was excellent except for

Cont. page 742

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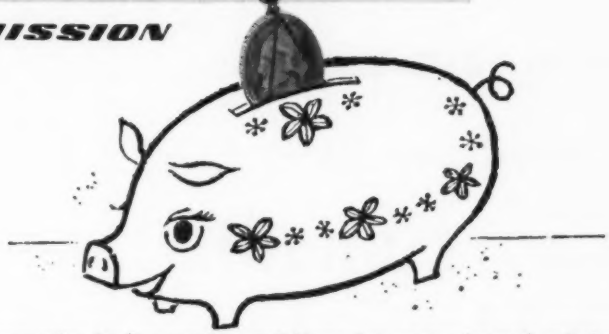

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plantations overtopped with aspen.

In northern Minnesota Roe also conducted pioneer aerial spray tests for both control of hardwoods and release of conifers (*13, 14*). Shortly thereafter a number of forest industries in Minnesota followed suit, often using different spray prescriptions. The different spray mixtures used on brush conditions more variable and complex than in Lower Michigan produced a variety of initial release results ranging from very good to very poor.

Since 1953, aerial spraying for releasing conifers and for other brush control jobs has become accepted practice in the forests of the Lake States. At the present time about 6,000 to 8,000 acres are being sprayed annually. Probably the largest share of this work is in Lower Michigan to release pine from scrub oak; this can be done with as little as ½ pound of 2,4,5-T in either 2 gallons of fuel oil or 2½ gallons of oil-water emulsion per acre. In other parts of the Lake States, particularly Minnesota, brush conditions are more complex, often being composed of overstory hardwoods with an understory of sizeable brush. Release results under such conditions, while satisfactory, are not as spectacular as in oak stands and require 1½ to 2 pounds of herbicide in 2 to 4 gallons of oil-water carrier per acre, depending on the species and density of the hardwoods.

Following the successful use of aircraft spraying of herbicides for conifer release in the Lake States, the practice has been tried in the Eastern (*10*), Central (*15*), and Southern States (*4, 5*). In the South, the degree of hardwood control is quite variable because of the many different species and sites involved. Also a factor is the variable growing season which is greatly influenced by the distribution of the precipitation. However, at least 10,000 acres are being sprayed annually for pine release. The spray mixture is generally 2 pounds of 2,4,5-T (acid equivalent) in 5 gallons of oil-water carrier per acre. Repeat sprays at 2- to 3-year intervals are also being considered by many forest managers in the South.

In the Pacific Northwest some extensive spray operations have been made to release conifers from alder. Experimental work is continuing on the control of vine maple and related species.

Status of Present Knowledge

Considerable knowledge on aircraft spraying for conifer release has been accumulated from the field trials and research conducted during the past 10 years in various sections of the United States. Although much remains to be learned, we now have enough available knowledge when it is all brought together to control most hardwoods and brush conditions sufficiently for conifer release in the eastern forest regions. Space in this paper does not permit a handbook on conifer release by means of aerial sprays. However, the general principles involved in the aerial application of herbicides for conifer release and the range of prescriptions that can be used for individual release jobs are summarized.

Herbicides to use.—The low volatile ester formulation of 2,4,5-T, because of its effectiveness on most hardwood species and greater selectivity on conifers, is the principal herbicide for woody plant control as well as for releasing conifers. Other selective herbicides have limited uses for certain brush conditions where the degree of control can be increased or the costs of the operation reduced.

Silvex, a common name coined for 2-(2,4,5-trichlorophenoxy) propionic acid, has been reported to be slightly more effective on oak (*3*) in Pennsylvania, Florida,

Cont. page 744

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These forests are located in Southeastern Alaska where high annual rainfall average, over 80", and near-constant temperature, ranging from 32° January average to 56° August average, support luxuriant vegetation.

Contained almost wholly within either the Tongass (16,016,806 acres) or the Chugach (4,725,610 acres) National Forests, timberlands are an extension of those in coastal Oregon, Washington and British Columbia. Coordinated plans manage "multiple-use" resources to provide simultaneously for continuous timber crop, water production, fish and game protection and for agriculture, mining, industrial plants, home- and town-sites, and water power development.

Timber is primarily western hemlock, superior to eastern for pulp, and also excellent for flooring; and Sitka spruce which, attaining diameters up to 8′ or 9′, is also the chief source for Alaska's saw logs and lumber. In smaller supply is the western red cedar, valued as a decay-resistant siding, and for shingles and poles. The Alaskan (yellow) cedar, so prized for its odor and its durable beauty, occurs in stands so scattered as to make its logging expensive.

Rough or soft terrain rules out tractor logging in much of the timberlands. Methods follow, instead, those of the Pacific Northwest, using heavy diesel-powered donkey engines — 150-200 HP — equipped with wire cables. Depending on timber locations, these rigs either pull logs from felling point to "cold decks" at spar trees, and hence to tide water or truck roads . . . or, mounted on floats, they move logs directly from slopes to salt water. Transportation to mills is almost entirely by water and a system of protected seaways makes all parts of the region readily accessible.

Residents and miners may take timber free of charge for personal use, not for resale. Individuals and industries purchase cutting rights on long-lease terms, which usually require clear cutting of all merchantable timber on the sale area, except for groups of trees selected to provide natural reseeding. To further the economy of the State, it is also stipulated that this timber may not ordinarily be exported in raw form for out-of-state manufacture.

A high proportion of the hemlock and spruce is pulp timber suitable for integrated sawmill, peeler and pulp operation, which must be removed to make removal of the high grade logs profitable. The Ketchikan Pulp Co. mill, opened in 1954, became the first Alaskan market for low grade spruce and hemlock. Designed to produce high-grade dissolving wood pulp suitable for processing into rayon or cellophane, its maximum output is 585 tons daily. With the second such mill, Alaska Timber and Pulp Co., scheduled to open in 1960, the pulp industry in the area should become firmly established.

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Oklahoma, and Texas. However, lack of selectivity seems to limit its use for pine release.

On certain species, such as hazel, alder, aspen, birch, and manzanita, the low volatile ester of 2,4-D is as effective as 2,4,5-T. Whenever 2,4-D can be substituted for 2,4,5-T, costs can be reduced. Mixtures of the two esters have not had as good results on most hardwoods as have equal rates of the individual herbicides. This is explained by the fact that 2,4,5-T is effective on more hardwoods than is 2,4-D; adding the latter often has a diluting effect. For this reason 50/50 mixtures of the two esters are not recommended except for very special brush conditions.

The amine salt forms of 2,4-D and 2,4,5-T have often produced good results with ground applications, but consistently good results have not been obtained in aerial applications.

Invert emulsions (droplets of water dispersed in oil) of 2,4,5-T, which produce large droplets to prevent drift in aerial application work, are still in the picture where drift is a special problem. However, they may not have sufficient selectivity on conifers. In addition, invert emulsions are more difficult to apply because they require special nozzle adjustments and are hard to pump.

Rate per acre.—One to two pounds acid equivalent of the herbicide mixed in 2 to 5 gallons of carrier is the usual range of rates per acre. For local release problems this rate of application can vary from ½ pound of 2,4,5-T in 2 gallons of diesel oil per acre for release of pine from scrub oak in Lower Michigan to 2 pounds in 5 gallons for release of pine from oak in the South.

The rate per acre is governed by the density of the overstory hardwoods and brush to be controlled as well as the species of brush. For exceptionally dense brush or multistoried brush conditions, two spray applications at 2- to 3-year intervals are more effective than one heavy application.

Carrier to use.—Two types of carriers (water and oil) and many combinations of each are being used to dilute the herbicide in aerial spray work.

The esters form solutions when mixed with oil, and emulsions when diluted with water. Oil-water emulsions (1 part chemical, 2 parts No. 2 fuel oil or No. 2 diesel oil, and 7 parts water) have been used extensively for release work in the Lake States.

Three disadvantages of oil over water are frequently cited, (1) higher evaporation, (2) higher cost, and (3) a possible tendency to damage pine. Actually, fuel oil evaporates more slowly than water and, of course, costs more. Moreover, oil forms a solution in ester herbicides, making it easier to mix without forming invert emulsions and giving it the ability to penetrate the surface of hardwood foliage. Controlled tests are rapidly bringing out still more advantages of oil carriers. In a recent unpublished test in Lower Michigan the oil carrier was found to be superior to water carriers in controlling aspen and oak. In fact, for the same degree of control about one-third less herbicide was required in an oil compared to a water carrier.

Most oil carriers used have been diesel oil (or comparable grades of fuel oil). No doubt large quantities of this type oil can damage conifers. This has been considered a problem in southern pine release because of the spurts of new growth that follow periods of summer dormancy.

Non-phytotoxic oils (paraffinic oils) have been used to some extent as a carrier for effective pine release work in the mid-South without damage to the conifers. Oils of this type cost more than diesel oil, but they should be considered

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on difficult-to-control brush where damage to the conifers is a problem.

Degree of control needed for release.—The degree of control that can be obtained in one treatment depends on the mixture of species, their vigor, and density. For pine release complete control of all the competing hardwoods and brush is not necessary. In most cases, 50- to 90-percent control of the hardwoods will achieve sufficient release to tip the stand development in favor of the conifers.

When to spray in regard to stage of physiological activity.—Sprays are applied after the hardwoods are fully leafed out and the growth of the conifers has started to harden off. This hardening-off process is difficult to identify for all conifers. In general, after the new needles are nearly as long as the old ones is one guide to use; another is 4 to 6 weeks after full-leaf development of the hardwoods.

A study of the tolerance of six conifers (red, jack, Scotch, and white pines, Norway spruce, and white spruce) to foliage spray applications of 2,4-D and 2,4,5-T in northern Lower Michigan (*1*) showed that the new growth of these conifers was easily damaged at rates of 1 to 2 pounds acid equivalent in 2½ and 5 gallons of water-oil carrier per acre until the new growth hardened off. This was July 15 for white spruce; August 1 for white pine, red pine, and Norway spruce; and August 15 for jack pine and Scotch pine. The foliage of hardwoods in this latitude reaches full-leaf development about the middle of June; they are susceptible to foliage sprays for at least two months afterwards (*1*). In general, the hardwoods should be physiologically active at the time of the spray application so that the herbicide will be translocated from the foliage to the roots.

In some regions, there are often stages of growing-season dormancy during periods of dry weather; the conifers may then put on new growth several times during the late growing seasons as the soil moisture improves. Under these conditions, it is difficult to spray without some temporary setback in the new growth.

Stages of phenological development suitable for the application of foliage sprays correspond to the following general periods in different forest regions of the east:

Eastern Region	*Period*
Lake States	July 15-August 15
Northeastern States	July 15-August 15
Central States	June 15-July 15
South	The month of June

When to release in regard to stand development.—Normally forest managers are anxious to release suppressed conifers as soon as possible to avoid loss in growth. However, if the overhead brush and hardwoods are killed back before the conifers are capable of utilizing the extra growing space, additional herbaceous vegetation and brush species frequently develop, which adds to the release problem rather than reducing it. Therefore, the stage of stand development needs to be carefully appraised to be cer-

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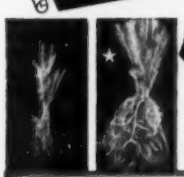

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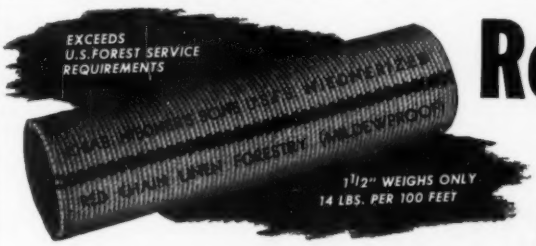

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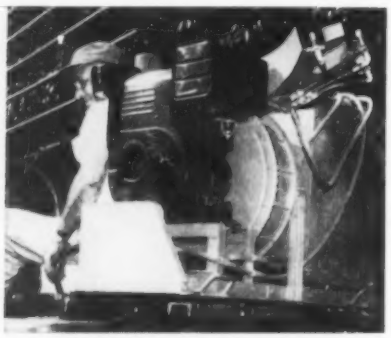

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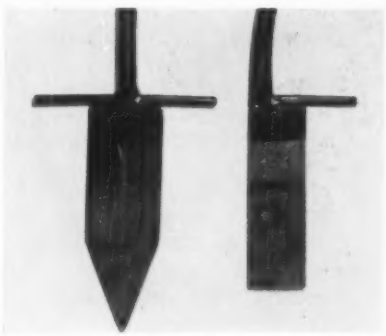

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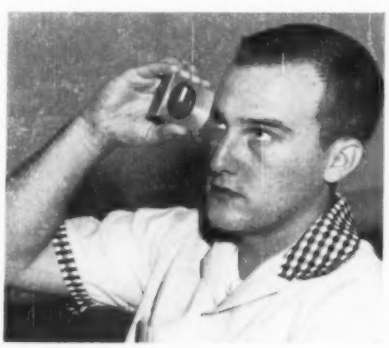

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d Station, Jackson 4, Mississippi

tain the conifers can effectively utilize the additional growing space made available to them by the vegetation killed or temporarily set back in growth by the herbicide treatment. It should be recognized that two sprayings are needed to bring some stands through the brush. Delaying the operation might result in heavy losses of conifers.

Type of aircraft.—Slow-flying piston-type aircraft are being used for applying herbicides. This includes both helicopters and fixed-wing aircraft. Because of lower operating costs, the fixed-wing is preferred where it will do the job. Helicopters have special use in rugged country, inaccessible tracts and areas where more than one level of overstory are suppressing the conifers. If the overstory of hardwoods is exceptionally dense or of different heights, two applications with fixed-wing aircraft at intervals of 1 to 3 years need consideration over one heavy application with a helicopter. In general, however, this situation rarely occurs because conifers, especially pine, could not be established or survive very long under exceptionally dense hardwood and brush overstories.

Marking the areas to be sprayed.—Forest managers are continually toying with different methods of marking the areas to be sprayed. They can increase the costs an additional $1 to $2 per acre by contriving all sorts of marking devices. It is well known that different pilots require different degrees of ground markings for accurate navigation. Many pilots would like to see each area to be sprayed bordered with neon lights. The job may be simplified by placing more responsibility for marking the areas on the pilot. The boundaries of the tract to be sprayed need to be clearly identified for the aircraft operator by the owner. The aircraft operator may then be able to mark these boundaries so that they can be identified from the air for spraying purposes at costs less than the forest manager could achieve.

Costs.—In all release operations the costs depend mainly on the size of the operation and the quantity of spray applied per acre. Other items that affect costs are distance from spray job to loading points, efficiency of loading, etc.

Release costs using fixed-wing aircraft in the Lake States generally average less than $5 per acre. These are about the lowest in the country. Costs in other regions where 2 pounds of herbicide are applied at the rate of 5 gallons per acre average about $8 per acre.

Release costs with a helicopter are about $10 per acre.

Aircraft operator's responsibilities.—Regardless of how much is known about conifer release with aerial sprays, the correct spray and timing of the application cannot achieve desired results unless the aircraft operator places the spray on the brush to be controlled at the prescribed rate of application.

Overlapping of spray swaths wastes chemical and can damage the conifers by excessive rates of application. Missing strips is also unsatisfactory, but narrow-strip misses are not serious. Spraying when the wind exceeds 5 miles per hour can cause excessive drift and poor coverage.

The most serious trouble that can be caused by faulty aircraft operation is spraying outside the boundaries of the tract to be treated. This can not only damage the property of others, but creates such poor public relations that the practice of aerial release may be set back or even prohibited by law.

Many forest owners are not acquainted with the best spray prescription needed for their release job. Aircraft operators should not accept release jobs without being sure that they are applying the proper spray at the proper time. Poor results from such lack of knowledge also discourage further release work by aircraft.

Aircraft operators, therefore, have a double responsibility in aerial release work. The first is the normal responsibility of knowing how to place the herbicide mixture

where it is needed. This requires proper equipment and ground controls for accurate flying. The second responsibility is to seek competent technical assistance on spray prescriptions for different brush conditions. Successful spray operations will stimulate more business. Poor results will decrease business. Thus when working with uninformed forest landowners, the aircraft operator should make certain that the correct spray prescription is being applied at the proper time, and that he is using proper equipment and accurate flying.

Wildlife Considerations

The first public reaction to spraying herbicides by aircraft is concern for wildlife. 2,4-D and 2,4,5-T are not toxic to game animals or livestock. In fact, these herbicides are commonly used for wildlife habitat improvement purposes to provide openings or to stimulate more browse in certain cover types.

The effects of different methods of pine release on wildlife have been reported by Gysel (*8*), working in Lower Michigan where recreation is an important use of the forests. He found that release methods, including the use of aerial sprays, could be used for improving wildlife habitat.

Methods for maintaining wildlife habitat in aerial release work were suggested in 1955 by Arend and Coulter (*2*). They recommended that if the area to be released exceeded 40 acres, unsprayed strips 30 to 50 feet wide be left at 10-chain intervals parallel to the flight lines. Unsprayed strips of this pattern can be established at no extra cost. They also recommended that vegetation along stream banks be left unsprayed.

Still More to Learn

To achieve more successful release of conifers with aerial applications of herbicides and to reduce the costs of the operation, more information is needed on all phases of the work. In other words, we need to know more about what we already know.

More specific information is needed on the translocation of 2,4-D and 2,4,5-T in the species of hardwoods and brush to be controlled. This includes minimum quantities required at different ages, sizes, stages of physiological activity, and vigor of the plant for effective control. Such knowledge will enable the forest manager or aircraft operator to prescribe minimum rates and accurate timing for each operation to achieve better results at reduced costs.

The effects of carriers or methods of diluting the herbicide have not been carefully studied. A water diluent is the least expensive, but perhaps the amount of herbicide needed for effective control can be reduced with different oil carriers. Exploratory tests in Michigan have shown that for the same degree of control less herbicide is needed with diesel oil carriers than with water carriers. The use of non-phytotoxic oils, an accepted commercial practice, needs further exploration in some areas.

The time of day such as early morning versus late evening, temperature, and humidity conditions when the herbicide is applied may affect results. The influence of spray equipment and the size of spray droplets on the effectiveness of herbicide applied by aircraft are also relatively unknown.

Summary

Since 1950 the use of aircraft to apply selective herbicides for the release of conifers from less desirable hardwoods and brush has been tried with varying degrees of success in most forest regions of the

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United States. Its use to date has been most successful in the Lake States.

Although additional research is still needed, sufficient workable knowledge can be assembled from tests made to date to prescribe spray mixtures for the control of most eastern hardwoods and brush conditions for conifer release purposes. The general spray prescription for most extensive use is 1 to 2 pounds acid equivalent of 2,4,5-T in 2 to 5 gallons of oil-water carrier per acre. The quantity of herbicide and carrier (water versus oil) needs to be varied for each brush condition.

The spray prescription should be applied after the hardwoods are fully leafed out and the new growth of the conifers has started to harden off. This is 4 to 6 weeks after full-leaf development of the hardwoods, depending on the forest region. Some growth activity in the hardwoods is required to achieve effective control.

No general detrimental effects to wildlife have been reported from aerial spray release operations. Where the hardwoods to be controlled produce wildlife food, such as acorns, unsprayed strips can be considered.

Basic research to better understand the translocation processes of the selective herbicides in plants will help refine present spray prescriptions and the timing of the treatment. This will increase the effectiveness of spray treatments and reduce costs.

Because of the economy of the operation and the number of acres that can be sprayed per day in comparison to ground methods, aircraft, both fixed-wing and helicopter, will be used more extensively for future release of conifers.

How rapidly the practice of aerial release of conifers spreads in any one forest region will depend to a large extent on the resourcefulness and integrity of aircraft operators. They have a dual responsibility in release operations. They need to provide the proper aircraft spray equipment and apply the herbicide accurately on the tracts being treated. In addition, they need to seek technical knowledge on proper spray prescriptions and timing of the application in order to reduce poor results. Failure on either type of responsibility will discourage the practice of aerial spraying for conifer release.

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Notes and Observations

Three Young Plantations of Hybrid Larch

The larches have a number of characteristics that should endear them to the forester and to the tree improver—rapid juvenile growth in both height and diameter, superior form, valuable wood, ready crossability between species, early cone production, and hybrid vigor. Time and effort spent on developing better larches should yield abundant returns in both finer trees and professional satisfaction. The spectacular performance of some of the hybrids that have resulted from chance or deliberate crossings and the fact that improvement carries over into the second and even subsequent generations have been of interest to both European and American foresters.

Hybrid larches are scarcely new. The controversial *Pinus* (Larix) *pendula* of Solander, reputed to be *L. decidua* × *laricina* (*2*), was described in 1789; but as early as 1749, Peter Collinson had three species of larch growing in his garden at Peckham, England, with ample chance for cross-pollination. By far the best known is the Dunkeld hybrid larch (*Larix* × *eurolepis*) described by Henry and Flood (*3*), which arose from the natural crossing of *L. kaempferi* and *L. decidua* in Scotland. British foresters have grown this tree in considerable quantities and esteem it highly.

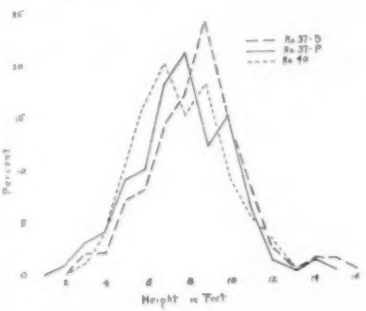

FIG. 1.—Height class distribution of three young plantations of hybrid larch.

Cooxrox Forest is located on the Grit Plateau in southeastern Rensselaer County, New York, at elevations of 1,200-1,400 feet. Its fertile, well-drained soil plus relatively high rainfall and humidity make it especially favorable for larch, and the growth of some of our trees has been exceptionally rapid. The older plantations were grown from commercial seed whose exact sources are always open to ques-

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tion. Most of the younger plantings are from seed given us by fellow larch enthusiasts or collected on the forest or elsewhere, so that the source of the seed—and sometimes its female parent—are known in some detail.

In 1951 three small lots of larch seed were sown at the Saratoga Nursery. Stock was too small for planting as 2-0, was only a little over-size as 3-0. These trees were used to make Plantations No. 37-Bedgebury, No. 37-Perthshire, and No. 40. Both segments of No. 37 were planted on land being converted from weed hardwoods (*1*); No. 40 was set on old sod. Planting was done as opportunity offered between the 1953 and 1954 growing seasons.

Seed for No. 37 was donated by R. F. Wood, silviculturist of the British Forestry Commission. The Bedgebury segment (Seed Lot #51/135) came from a plot of hybrid larch at Bedgebury, Kent, stock for which had come from Glamis,

FIG. 2.—The Bedgebury Giant in No. 37, four years after planting, 14.7 feet tall. Nyland. 1957.

in Scotland. As the parent stand is largely F_1 hybrid, this seed would be classed as F_2. Perhaps five percent of the 1-0 seedlings were albino. The Perthshire segment (SL #51/208) came from a single Japanese larch growing on the Drummond Hill Forest in Scotland. As this tree is surrounded by European larch, the seed is probably F_1. On the basis of twig color and foliage, both these lots are mostly if not entirely hybrid plants.

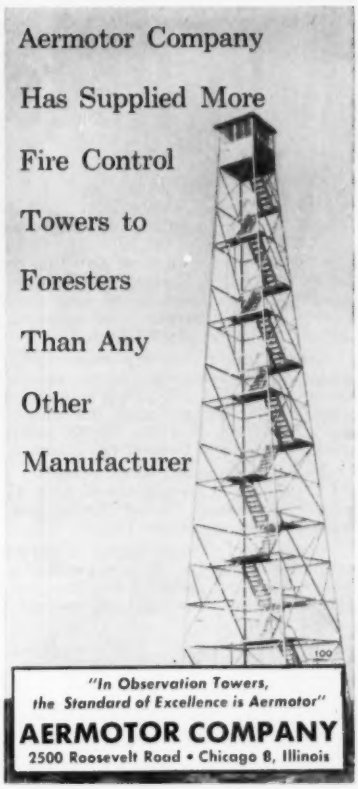
Seed for No. 40 was collected at Cooxrox Forest from a Japanese larch of SL#23, which is surrounded by Japanese and by nearby hybrid and European larches. While their foliage closely resembles that of the Japanese parent at the same age, winter twig color is a soft pink rather than the copper red of typical Japanese.

At Christmastime 1957 we counted survival (91, 93, and 94

International Society for Tropical Ecology

The International Society for Tropical Ecology, organized in India in 1956, is inviting applications for membership. The society proposes to publish a journal dealing with all phases of plant and animal ecology in the tropics.

Information about the Society may be obtained from the secretary, Dr. G. S. Puri, regional botanist, Botanical Survey of India, Poona 1, India.

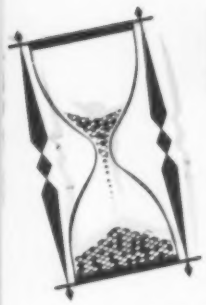


percent respectively) and measured heights to the nearest .1 foot. The percentage distribution by height is shown in Figure 1. Four seasons after field planting and seven years from seed, these plantations have average heights of 7.8 feet, 7.7 feet, and 7.6 feet, the last probably somewhat depressed by grass competition and one dry summer.

These little plantations—of 115, 275, and 84 seedlings—are of special interest because the sources of the seed are known in some detail for two generations. But what we consider most important here are the trees at the extreme right end of the curve—six 12 foot, two 14 foot and one 15 foot tree. These last represent less than two percent of their respective populations. On the basis of a quarter-century of experience with larch on this forest, we believe that these are superior individuals that will continue to maintain a leading position in the stand. In height—the only meaningful measurement at

Cont. page 754

You Can't Afford To Wait ...



In Regenerating Southern Pine !

In 1952, the T. L. James & Company launched a program to put their idle Louisiana lands to work. The interest in forestry was natural, for the company's founder, T. L. James, Sr., began his climb in the business world with a sawmill long before his career in investments, oil and construction work had begun.

Setting up a forestry division for the purpose of broadening the company's corporate base, the T. L. James & Company started reforesting approximately 19,000 acres of Louisiana holdings. Today, the total acreage of the company is 134,000, of which 90,000 are denuded long leaf barrens acquired in Central Louisiana.

To regenerate this land, company foresters contacted W. F. Mann, Jr., researchist in pine regeneration at the Alexandria Research Center, Alexandria, La., and father of the direct seeding method.

Immediately things began to happen. A new nursery was built in Ruston. A seed extraction plant was constructed with refrigeration facilities geared to perform a reforestation job. The goal: regenerate pine in the shortest possible time.

In the Spring of 1957, a thousand two hundred seventy-two acres were direct seeded. In the Spring of 1958, twenty-five thousand acres were regenerated, of which only four thousand were planted with the conventional planter. The remainder, a total of 21,000 were direct seeded by air with both fixed wing plane and helicopter.

In reviewing results, company foresters were pleased at the saving of time and money with direct seeding over conventional methods. But it occurred to them that the direct seeding method might be streamlined by combining three operations—land clearing, discing, and direct seeding. If a tool could be devised to combine the three operations in one, it would break the time barrier — chief deterrent to reforestation of the South's millions of idle timberlands.

Foresters of the T. L. James & Company took the idea for their "better mousetrap" to officials of Rome Plow Company, Cedartown, Ga., foremost manufacturers of soil and site preparation equipment in the world. In their initial interview, they presented their problem, their successful experience with direct seeding, and statistics on the number of acres needing reforestation in the South. Convinced of the need for a new planting tool, Tom Mullen, founder and chairman of the board of Rome Plow Company, gave his engineers the green light.

The first of the new tools will finish all of T. L. James & Company's planting program this fall and spring in one fell swoop — regenerating 50,000 acres of denuded land in Central Louisiana.

As the first of the new tools go to work planting pine on T. L. James land in Central Louisiana this fall, the eyes of the forestry world will be riveted on an operation that could easily make all other methods of pine planting obsolete and speed reforestation in the South.

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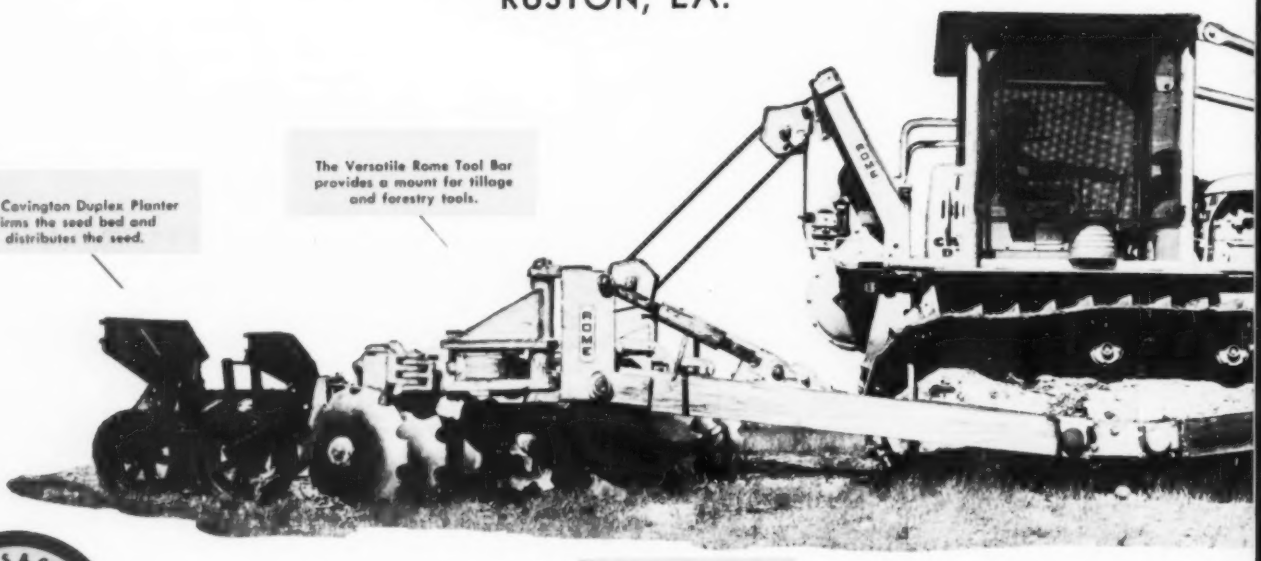
RUSTON, LA.


The Covington Duplex Planter firms the seed bed and distributes the seed.
The Versatile Rome Tool Bar provides a mount for tillage and forestry tools.
Rome Tool Bar Disc Harrow prepares the seed bed.

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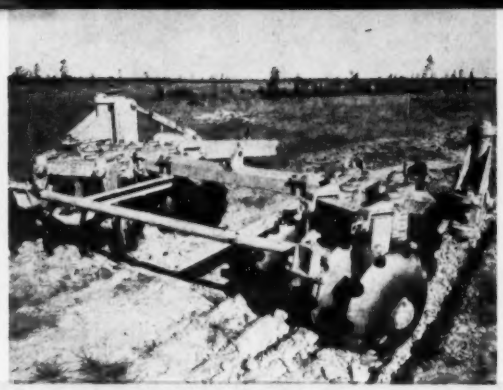
T. L. JAMES & COMPANY WILL

The Rome K-G Clearing Blade clears a path of small brush and trees up to 8" in diameter in a single pass. Larger trees may be removed by multiple passes with the blade.



The Rome Tool Bar Disc Harrow prepares and pulverizes the seed bed, and returns organic matter to the soil.

The planting tool built by Rome can be adapted to any type of farm tractor having a three point suspension hitch. The Covington Duplex Planter drops slash and loblolly seeds alternately and presses them into the firmed seed bed. Each wheel floats freely, allowing planting over uneven terrain.

With This "Mousetrap" ---
TLJ Co. Will Break the Time Barrier

Because the pilot model of the new tree planter has test proved that Southern Pine can be regenerated at 25% of the cost of planting seedlings, T. L. James & Company made a decision which has startled foresters in the South. After one year their pine nursery was converted to the growing of wildlife food. They plan to complete their planting operations in a single year — 50,000 acres of cutover pineland — by the direct seeding method. The lion's share of the planting load will fall on the new planter created jointly by TLJ Co's foresters, and the engineers of Rome Plow Company, and W. F. Covington Planter Company, Dothan, Alabama.

The result? (1) A saving in the time usually required for pine regeneration. (2) A saving up to 75% of the amount normally spent in planting seedlings. (3) A reduction in time required to amortize invested capital. Foresters of T. L. James & Company are confident they will not only amortize their total investment by the date of the first thinning, but will show a profit at the same time.

The T. L. James & Company undertakes this program with the cooperation of the men of Rome Plow Company and W. F. Covington Planter Co. with the conviction that direct seeding will not only complete their own reforestation efforts quickly and efficiently, but will speed complete reforestation in the South.

Let's Look at Cost Comparisons:

1.

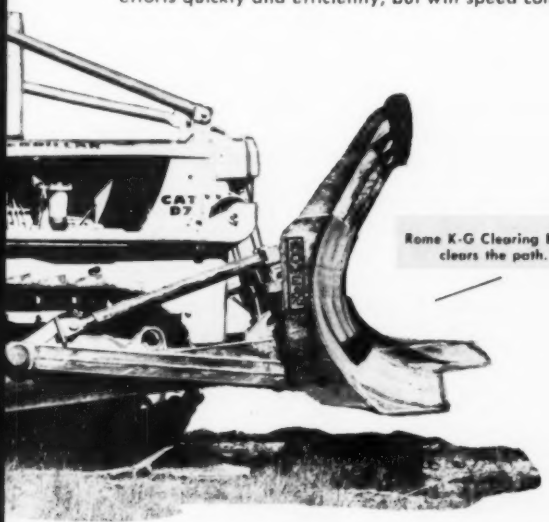
Conventional Method: (Planting Seedlings) Costs X dollars per acre

2.

Direct Seeding by Air. Fixed Wing or Helicopter: ½ X dollars per acre

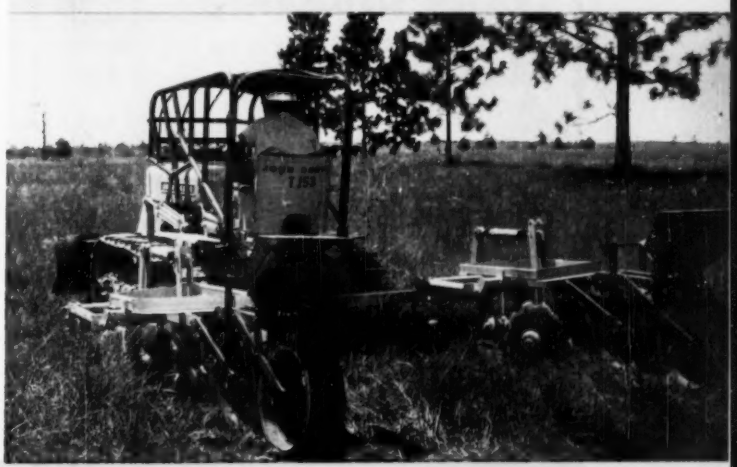
3.

The New Method: ¼ X dollars per acre or 75% saving over conventional method.



Rome K-G Clearing Blade clears the path.

The planting tool built by Rome can be adapted to any type of farm tractor having a three-point suspension hitch.



DIRECT SEED 50,000 ACRES IN 1959-60

this age—they are twice as tall as the average tree. Such exceptional specimens may well provide the material from which will come the super-larches of tomorrow. Figure 2 shows the Bedgebury Giant, a fine tree in any forest.

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DAVID B. COOK and
RALPH D. NYLAND
Albany, New York

Second National Forestry Convention August 10-15, 1959, Mexico City

The Second National Forestry Convention in Mexico was organized by the Undersecretary of Forest Resources, the Mexican Association of Professional Foresters, and the National Chamber of Forest Industries.

The purpose of the convention was to provide an opportunity for broad and thorough discussions of the many aspects of the forest problem. Its primary task was to provide data on which might be formulated a definite forest policy for Mexico and to suggest revisions in legislation necessary for more effective administration. Specifically, the efforts of the convention were directed toward: (1) securing an inventory of forest resources as a necessary basis for rational planning; (2) establishing a definite national forest policy for the purpose of efficiently administering these resources with regard to their production, management, and proper utilization; (3) defining neeessary legislative measures in order to obtain better administration; (4) developing the forest industries; and (5) organizing forest credit that would permit the establishment of new industries and the improvement of existing ones.

President Lopez Mateos opened the meeting on the morning of August 10 at a plenary session attended by ranking officials of the Mexican Government and a large number from the diplomatic corps. Dr. Richard E. McArdle, Chief of the United States Forest Service, was present as representative of that organization. This would seem to mark the first time in which a chief of the U. S. Forest Service has paid an official call on Mexico.

At the plenary session an estimated 1,000 delegates were in attendance, comprising Mexico's leading foresters and conserva-

Cont. page 758

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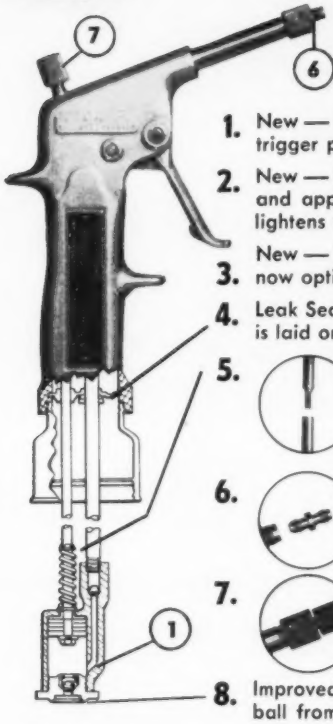

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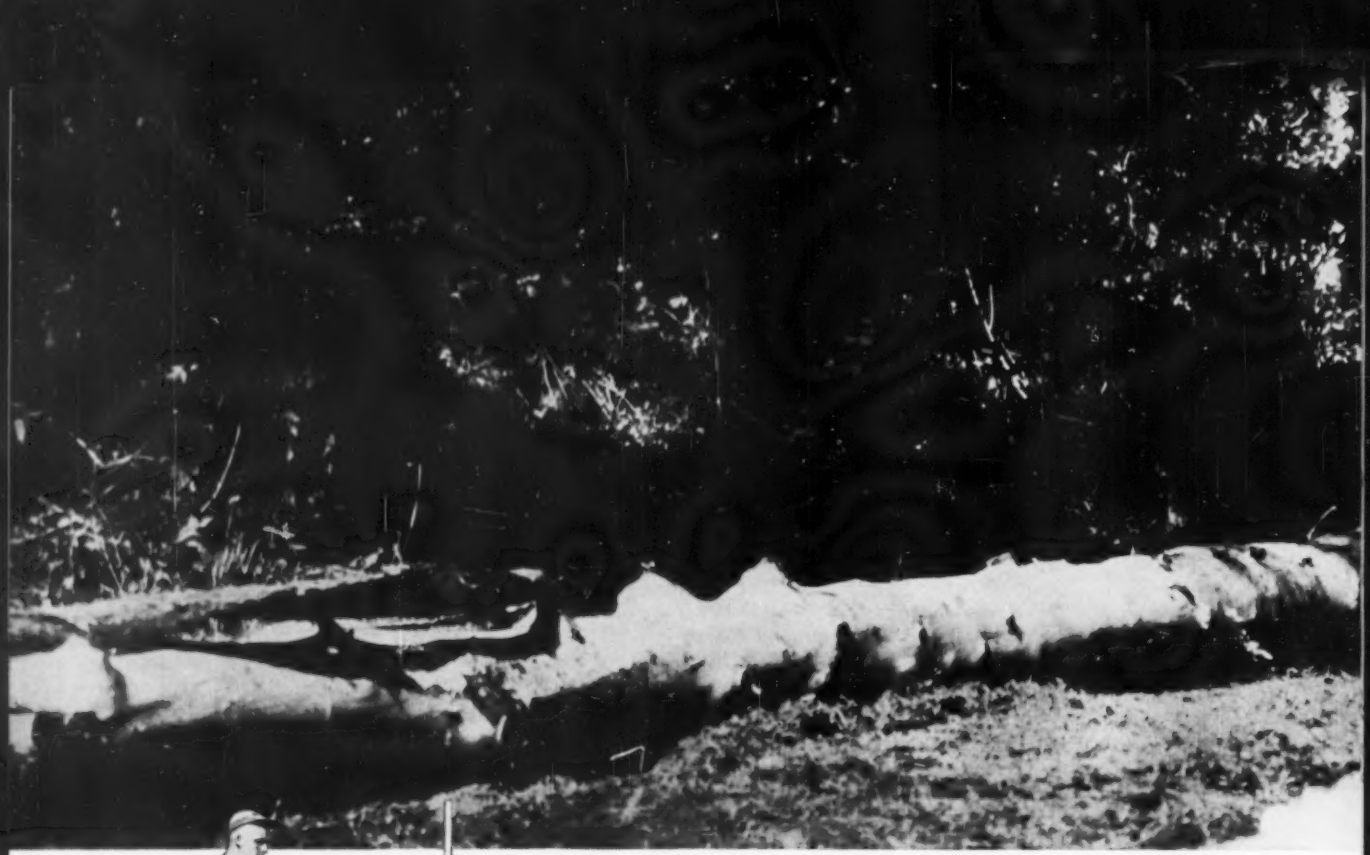

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tionists and representatives of the forest products industries. Following the plenary session, delegates were divided into working sections dealing with the following subjects: (1) forest inventories; (2) policy, legislation, and administration; (3) industry and credit; (4) protection, and economic and social problems; (5) research, experimentation, and training; (6) wildlife. These sections were organized with a view to providing ample opportunity not only to read contributed papers but to discuss freely and thoroughly all phases of the forest problem.

The papers together with recommendations and resolutions of the convention will be published, and should form a valuable contribution to forestry literature and, together with the discussions, provide an orientation for solving many of the forest problems of the Republic.

One day was devoted to field excursions to enable the delegates to visit pulp and other forest products establishments. Among the most popular attractions of the convention were special exhibits installed in the National Institute of Forest Research. These covered the almost endless variety of articles produced by the forests of Mexico, from telephone poles to yeast. There were panels of exquisitely figured tropical woods, exhibits of packaging, of plywood, and of construction timbers—products that in their number and diversity told of the many ways in which the trees of Mexico were increasingly fulfilling the needs of the Mexican people.

On the last plenary meeting a permanent commission was elected to arrange for the third national forestry convention, to take place in 1962.

The convention was by far the most important Mexican forestry congress during the past 18 years. Since 1941 when the first national forestry convention was held, there had been no opportunity to deal with the forest problem with the thoroughness that the problem merits. The first convention published its proceedings under the title *Memoria de la primera convencion nacional*, which served as a valuable milestone in forestry literature. Since that time, however, much has happened, both administratively and professionally, which emphasized the need for the present convention.

But for the most part the chief motivation for this second convention lay in the fact that Professor Enrique Beltran had been selected as undersecretary in charge of forest resources. Internationally known, active for many years in the field of conservation, prolific author, and since 1952 Director of the Mexican Institute of Renewable Natural Resources, Professor Beltran's appointment heralds a new era in Mexican forestry. A scientist of the highest professional standing, he brings to the administration of Mexico's national forests an influence unequalled since the days of Miguel de Quevedo. One of the important outcomes of his administration will in all likelihood be a closer rapprochement between the federal forest administrators and the forest products industries. The viewpoint he has often expressed is that the forests of Mexico exist for the benefit of the Mexican people, and the ex-

Two Members of the Society of American Foresters Honored

Enrique Beltran and Tom Gill have received from President Lopez Mateos of Mexico the rarely awarded de Quevedo gold medal, Mexico's highest conservation honor.

Professor Beltran, Honorary Member of the Society and Mexico's leading conservationist, was recently appointed undersecretary of Forestry Resources and Game. Tom Gill, executive director, Charles Lathrop Pack Forestry Foundation, is the first non-Mexican ever to receive the de Quevedo award.

The presentations were made during the closing plenary session of the Second National Forestry Convention, held August 10 to 15, 1959, in Mexico City.

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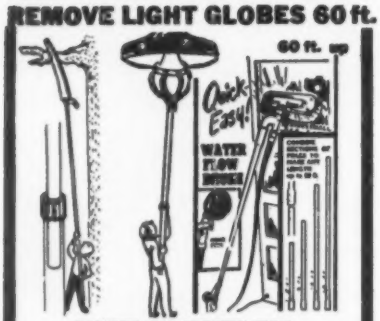

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ploitation of the forests is something to be sought for and encouraged whenever and wherever it can be carried out on the basis of forest improvement and forest permanence.

Under Professor Beltran's administration too there is renewed hope that the proposed North American Forestry Commission may become a reality and prove an effective implement for closer contacts and mutually helpful relationships between foresters north and south of the Rio Grande.

The S. R. Gevorkiantz Memorial

S. R. (George) Gevorkiantz, for thirty years biometrician at the Lake States Forest Experiment Station, for ten years an associate editor of the JOURNAL OF FORESTRY, and a Fellow of the Society of American Foresters, died in May 1958.

A volunteer group has been formed to perpetuate his memory. It consists of M. B. Dickerman of the Lake States Forest Experiment Station, Charles R. Binger of the Minnesota & Ontario Paper Company, F. H. Kaufert of the University of Minnesota School of Forestry, E. L. Lawson of the Minnesota Conservation Department Division of Forestry, and Paul O. Rudolf of the Lake States Forest Experiment Station. The first four also function as an Executive Committee.

This committee decided that an appropriate and feasible memorial would be an annual cash award to be given for the best research paper by a forestry student in one of the Lake States forestry schools. Emphasis in the choice will be on originality of thinking and the contest will be open to undergraduate and graduate forestry students alike. The size of the award and the number of years it will be given will be dependent on the total of contributions received.

Those who wish to take part in setting up a George Gevorkiantz Memorial Fund from which this award will be financed may send their checks to: Paul O. Rudolf, Treasurer, Gevorkiantz Memorial Fund, 2322 Hendon Ave., St. Paul 8, Minnesota.

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Points of View

Comments on "What Kind of Forestry Schools?"

John W. Duffield in "Points of View" in the May JOURNAL and Kenneth P. Davis in the "Council's Column" of the same issue have made some important points and raised some questions on forestry education that should be debated and settled within the next two or three years. I have just finished an assignment in Guatemala where it was my job to establish a subprofessional school of forestry. I would like to give some opinions and present some problems on stratified forestry education.

Forestry education should be at three clearly defined levels.

1. Subprofessional. This should be a "three-year" course of about thirty months' duration. Fifty percent of the time should be spent in the field. Candidates for admission should be given entrance examinations so as to insure a homogeneous group. These schools should not be directly associated with colleges or universities. They should look to industry and the forest services for guidance and financial support. Instructors should be men of wide experience in the practical application of the forest sciences. Graduates from these schools would be prepared to survey, map, cruise, work in nurseries, plant, thin, protect, harvest, do park work, be assistants to county foresters and do jobs of a similar nature. These men should be known as *Practical Foresters.*

2. Professional. This should be a college course with a B.S. degree. The authors of the above cited papers clearly state the case for a fifth and sixth year of college work before awarding the degree. It is past time for the universities and colleges—and the legislatures—to do something about this expansion. These men would be known as *Professional Foresters.*

3. Advanced education. An effort should be made to raise the requirements for advanced degrees and these requirements should be standardized and adhered to. There appears to be too wide a variation in the caliber of men with doctor degrees.

I feel strongly that there is a great need for more subprofessional schools. Industry, private forests, federal and state forest services as well as the conservation services need subprofessionally trained men. There is a vacuum between the professional forester and the woods laborer. They hardly understand one another. The painful and expensive process of elimination of the poor workers that wander into subprofessional forestry jobs could be eliminated by hiring graduates of practical forestry schools.

We must standardize the terminology used to describe forestry posi-

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tions and titles. In the case of subprofessional education we hear *vocational schools, trade schools,* and *ranger schools.* These are ambiguous terms and the first two have bad connotations. Requirements for subprofessional degrees should also be standardized. I suggest that *Practical Forester* be the title of these men.

The word *ranger* is probably the worst abused of all the names applied to positions. In a state in the South it is used for park workers who spend most of their time on garbage collection and maintenance work. *Ranger* as used in the U. S. Forest Service means something—at least to foresters.

The Society should consider drawing up definitions of positions and titles. These should be circulated to entities concerned with forestry.

I do not think that licensing is all we want as foresters. This may be necessary to regulate the conduct of those who do not meet ethical standards. But this would likely be in the hands of politicians rather than in the hands of professional foresters. I would prefer that we raise the requirements for acceptance as Member in the Society of American Foresters. An appraisal of a man's education, experience and conduct should be made by a board of the local Section before he is accepted as a Member. A B.S. degree and six years' work should not automatically make a man eligible for acceptance. Then status as a Member in the Society of American Foresters would mean more to us and to the public.

We are concerned with the problem of enhancing the prestige of professional forestry. We should be. There should be more discussion and more concrete action.

JAY H. HARDEE
Forestry Advisor,
International Cooperation Administration

Is It Just A Habit?

On page 517 of the July, 1959, issue of the JOURNAL OF FORESTRY, Kenneth P. Davis comments on the use of the term "unit area control"; on page 518, of the same issue, John W. Duffield protests the use of the term "silvicide"; on page 532, also in the July issue, there is a resolution from the New England Section of the Society of American Foresters calling on the

Cont. page 764

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Society to prepare and present a resolution encouraging authors to adhere to standard terminology. Each of these articles, or notes, deals fundamentally with the same basic problem: specifically, the habit of playing "fast and loose" with forestry terminology.

The above three instances are not isolated cases. The habit is apparently widespread among foresters in the United States, and is not confined to any one agency, industry, or forestry discipline. Perhaps the most glaring misuse of terms is in the field of forest organization. Without a detailed accompanying explanation, it is almost impossible to converse with any of many industry foresters concerning working circles, compartments, blocks, subcompartments, or working groups, and be certain that both parties are speaking of the same area. There was apparently little effort made to conform to correct terminology when company forest organization was established, and now even less to correct the mistakes already made. It is now apparent that even the *ne plus ultra* of correctness, the research worker, has succumbed to this laxness of nomenclature.

What is the reason for this misuse of terminology? Is it carelessness? Is it an attempt to place a stamp of identity on a forest, or a method, which will identify some person for the sake of posterity? Or, is it just lack of knowledge and proper training on the part of the forester? If it is the latter, it is time for the schools of forestry to take stock of the vocabulary of their professors, for the student gains his professional vocabulary principally by sight from his textbooks and by ear from his professors, and it is a moot question as to which is the most important.

Regardless of where the fault lies, however, there is a definite need for improvement. If foresters are to continue to consider forestry as a profession, and themselves as professional persons, they must adhere to *all* of the principles of professionalism. Not the least of these is an absolute knowledge of fundamental methods and techniques, and an absolute fidelity to exacting terminology. In the final analysis, whether or not forestry is accepted as a profession, and the forester as a professional person, will not depend upon what the forester considers himself, but upon what stamp is placed upon him and his work by the general public. In so long as he maintains a lackadaisical attitude toward terminology, is uncertain of his ground in nomenclature, or attempts to put every method, technique, and principle into terms of basic English so that his client can understand it, just so long will he be considered a glorified firefighter, tree planter and "timber-looker."

Isn't it time for us as a group to step out of professional adolescence into the maturity of adult professional responsibilities?

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Book Reviews

The Mammals of North America

By E. Raymond Hall and Keith R. Kelson. 2 vols. 1,193 pp. Illus. Ronald Press, New York. 1959. $35.

Hall and Kelson have produced a monumental work, as indicated by the more than a thousand quarto pages and by the geographical coverage of the entire continent from Greenland and Alaska to Panama. It includes 3,679 subspecies of mammals of 1,003 species. The authors are eminent mammalogists who compiled the book while working at the University of Kansas. Dr. Hall called this his "principal project" for 14 years, while Dr. Kelson worked on the project full time for five years. Their familiarity with the mammals of North America and their careful work become evident to anyone studying these volumes.

Appraising such a voluminous work is as difficult as evaluating an encyclopedia. Each page is filled with the accumulated knowledge of generations of mammalogists, and each page indicates areas where further taxonomic and zoogeographic studies are required to reinforce that knowledge.

The plan of the work is consistent throughout. There is a brief anatomical description of each taxonomic category from order through genus. In many cases this is supplemented with a brief note regarding life history information such as food, time of activity, or habitat where such information can be given for the entire group. Where there are monographic studies or taxonomic revisions references are given. Numerous keys at the family, genus, and species levels are based largely on skin and skull characteristics and measurements. They keys seem well constructed and relatively unequivocal.

For each species the scientific name and a common name are given. These are followed by measurements, description of pledge, significant skull and tooth characteristics and other anatomical features where they are helpful in identification. More than 500 line drawings show critical skull characters. For many species there is also a very succinct statement on life history. Where needed, maps

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are used to show the probable geographic range of the species and the distribution of subspecies within that range. Recognized subspecies are not described nor are there keys for their identification. The synonymy, however, is clearly given and the user of the book is expected to refer to literature sources for such information. The range distribution maps are keyed to the subspecies by "marginal records." Where the subspecies has been identified near the apparent periphery of its range, the locality, literature citation, or museum specimen number is given so the reader can go to the source. These marginal records are indicated on the distribution map so the user of the book can evaluate the strength of the judgment on distribution which the authors have expressed.

The more than 500 distribution maps are especially pleasing and useful. They are clearly drawn and easy to interpret. The probable range of the species is uniformly shaded over a base map that shows country, state, and provincial boundaries. The authors have not hedged in presenting their opinions on species and subspecies ranges. For this courage they are to be congratulated. Mammalogists, professional and amateur, should find these maps a stimulating challenge to see if Hall and Kelson are right or wrong.

Users of these volumes will appreciate many "little" features. For example, the table of contents clearly shows the relations of not only the larger taxonomic groups, but goes down to genus. Paging is continuous through the two volumes. The complete index is repeated at the end of both volumes. The index seems extremely complete, and contains specific and subspecific designations as well as genus names.

Most readers of the JOURNAL OF FORESTRY will wish that one thing could have been added. There is no glossary to help the non-mammalogist understand the anatomical vocabulary and explain particular measurements used in descriptions and keys.

It is clear that taxonomic mammalogy is not yet blessed with stable terminology. Names for some of the familiar mammals of North America, as used here, will sound strange to the majority of readers. This starts with the first species of Volume I, since the law of priority apparently requires that the opposum be called *Didelphis marsupialis* rather than the more familiar *D. virginiana*. Even deer and moose do not go by their old familiar names. The genus of the white-tailed- and mule-deer is changed from the familiar *Odocoileus* to *Dama*, and the moose becomes *Alces alces* rather than *Alces americanus*. Taxonomists as well as non-taxonomists must continue to pray for the day when at least the familiar conspicuous mammals will have Latin names as stable as their common names.

Who will find use for this work? Certainly professional mammalagists will find it an invaluable source book. Certainly it should be a part of every professional forestry library on the continent. Some readers of the JOURNAL OF FORESTRY will find it valuable for determining which subspecies of mammal occurs in the area where they are working. Perhaps some JOURNAL readers will find these volumes ". . . an impetus to taxonomic study of American mammals," which is one of the stated purposes of the authors. Unfortunately the price of these volumes will prevent many from profiting by ownership.

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The National Forests

By Arthur Carhart. 289 pp. Illus. Alfred Knopf, New York. 1959. $4.75.

Carhart has chosen a distinctive method of dealing with the national forests. He has kept statistics to the minimum. He does not indulge in great detail about their economic values. Instead he takes the reader on a sampling journey through each of the ten national forest regions, identifying what he sees as the distinctive "flavor" of each region.

Some of the titles Carhart uses in his word pictures of the regions reflect this "flavor." Thus the story of Region 2 (mostly Colorado and Wyoming) is headed "Cradles of Rivers"; Region 3 (Arizona and New Mexico) is called the "Land of Little Rain"; Region 4 (Utah, Nevada and southern Idaho) is "A Basin Filled with Big Rocks"; Region 6 (Oregon and Washington) is "The Evergreen Empire"; and Region 10 (Alaska) bears the tag "The Green Gold of Alaska."

Before commencing the journey through the regions, Carhart gives a brief sketch of the general nature of the national forests, how they came to be, their various uses, the organization that administers them, and the policies and principles governing their administration. He emphasizes the basic statutory reasons for their establishment—securing favorable conditions of waterflows and furnishing a continuous supply of timber. Stressing the growing importance of the watershed function, the author deplores the lack of public understanding of this value, active concern often being manifested only when a severe water shortage arises. The other resources and uses of the national forests are then introduced.

Because of a feeling that the factor of geology has not been adequately recognized in books relating to the national forests, the author may go too far in the other direction in alloting space to this topic. But he does show in an interesting way how geological influences have in many cases resulted in present land forms, including a convincing showing that the ten thousand lakes of Minnesota are manifestations of earth movements and not the footprints of Paul Bunyan's big Blue Ox, Babe!

The descriptions of the trip through the ten national forest regions is replete with references to early explorers, historic events, outstanding Indian personalities, and other local color. Non-forested areas, such as the deserts of Arizona and New Mexico, are given their place as part of the distinctive quality of a given territory.

To supplement the word pictures the author has supplied an excellent assortment of photographs covering most of the physical resources dealt with.

Carhart's wide acquaintance with so many national forests has resulted in his committing very few errors of fact. Those that were detected are not significant, though the foresters in the longleaf and slash pine lands of the South might resent having these types assigned to the Piedmont rather than the flatwoods. Precise historians would rather he had said that Pinchot was fired by President Taft because of the ruckus he kicked up over Ballinger than to record that he resigned. In telling of fire's cleansing effect in killing off brown spot disease, accuracy would have been served by stating that this applies only to long leaf pine seedlings. And it is too sweeping to say that the best timber on the Tongass Forest in Alaska has been high-graded — that takes in too much territory.

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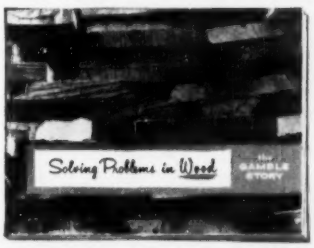

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This is no book for one who seeks only a statistical presentation or a mere objective appraisal of the national forests. I doubt if Arthur Carhart could bring himself to write such a treatise. He knows, understands and loves too much the kind of country embraced in the national forests. Here he has painted his picture with broad, sweeping strokes. For one who knows and loves the national forest country as he does reading the book is like another visit to these places; for the reader with a spirit of understanding that can be awakened it will surely fill him with a a wish to make such a journey himself. There he will see fulfilled the promise in the following quotation from this fine book:

"On these visits you may see the mists of morning, robing the crowns of Washington state's mountains, or trailing skeins of fog, dragging through timber of the lake country. Visiting forests on the dry tablelands of Arizona or New Mexico, you will see the three-toothed sage spreading out mile after mile, like gray-green rugs between the red-orange boles of old ponderosa pines. In another forest stand the great, gray ramparts of the Wind River mountains where grinding glaciers give birth to streams milky with rock flour.

"A nodding bluebell above a timberline spring, the sharp piping of a disturbed marmot, the smell of sun on pine needles, the cry of a soaring hawk, the crash of ripe old fir as it is felled, the whine of a little sawmill cutting rough lumber for local ranch buildings, wood smoke, the laughter of riders on a shadowy trail—all these may be met in the forests. And fire may be encountered, and also the building of roads and the battles against tiny insects and fungi that kill trees."

CHRISTOPHER M. GRANGER
Bethesda, Md.

Plants and Environment

By R. F. Daubenmire. 422 pp. 2nd ed. Illus. John Wiley and Sons, Inc., New York. 1959. $6.95.

The 10 chapters of this autecological treatment are devoted to introduction; the soil, water, temperature, light, atmospheric, biotic and fire factors; the environmental complex; and ecological adaptation and evolution. In this revision the format of the 1947 edition is followed but such topics as significance of dew for plants, evapotranspiration, urban microclimate, frost churning of soil, and atmospheric pollution have been appropriately inserted. The organization of the book gives it a somewhat compartmented character which is enhanced by a useful and rather complete chapter outline placed just before each chapter.

In considering one factor at a time there is difficulty in adequately conveying to beginning students

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the concept of the continuously operative impress of an environmental nexus, with a shifting in intensity of individual factors. Yet in general this is remarkably well done here and reflects considerable organizational acumen.

Chapters 2 to 8 discuss the significance and impact of individual factors on plant growth and distribution with generous references to field situations. There is considerable descriptive material on measurements of evaporation, humidity, precipitation, soil moisture, temperature, and light. These chapters cut across such discrete scientific disciplines as meteorology, soils, geology, chemistry, physics, and botany.

The individual factors which affect plants are considered in detail after only a brief introduction to factor interaction in chapter 1. Then in chapter 9, which is eminently good, the author considers factor multiplicity, heterogeneity of environment, variability of plant requirements, factor interaction, the dynamic nature of environment, and optima and limiting factors. Perhaps a stronger early introduction to the nature of this complicated and multifarious environment would better sustain the student through the six-chapter study of its facets. Some of the topics are better developed than others. For example, soil aeration was treated with thoroughness while such fashionable subjects as photoperiod and smog were less comprehensively done.

There are some disappointing and puzzling features. Literature citations are restricted to papers written in the English language. One could argue that even beginning students should be introduced to classical papers in several languages or at least have references to them. There also are virtually no references to the several other prominent plant ecology texts. Reference citations in the text are given as superscript numbers, thus not allowing for ready identification of text statements with authors of original papers except by continually turning to the back of the book. This reviewer would also have preferred Dr. Daubenmire to cite many more of his well-known papers in addition to the five cited.

A studied effort was made to bring the literature up to date. Of the 773 references cited over one-fifth are dated 1950 or later. Some readers may consider that there is a rather heavy emphasis on nomenclature and that the line drawings and graphs are only adequate. The photographs are well chosen.

On the whole the book more than meets its primary objective of elucidating basic principles. Its clarity, compactness, and information not only bespeak wide field experience and ability but also provide an appetizing insight into the rudiments of plant ecology.

THEODORE T. KOZLOWSKI
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Compiled by MARTHA MEELIG, *Librarian, State University College of Forestry at Syracuse University*
Range Management Section Compiled by NELLIE G. LARSON, *Library, U. S. Department of Agriculture*

General

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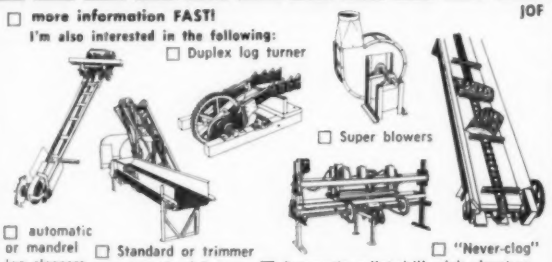

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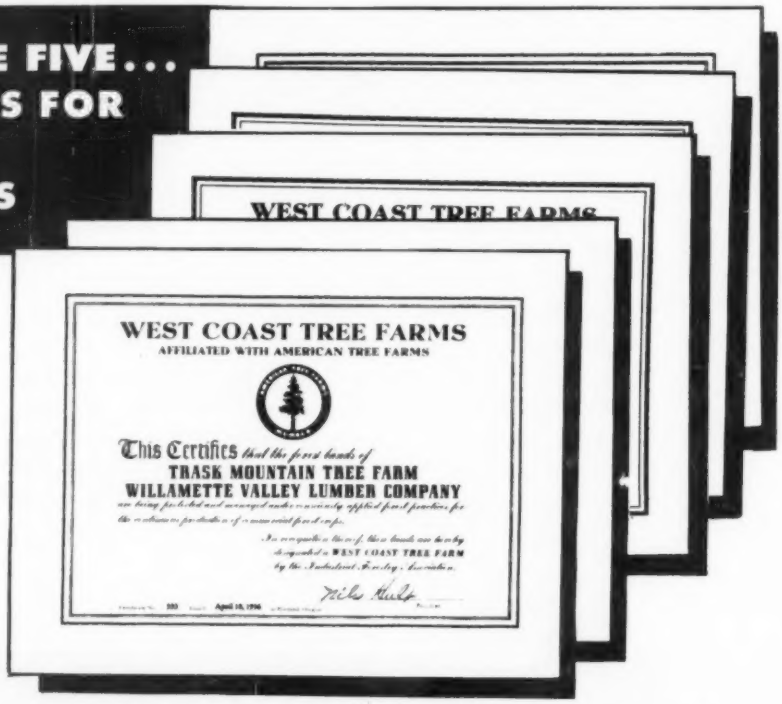
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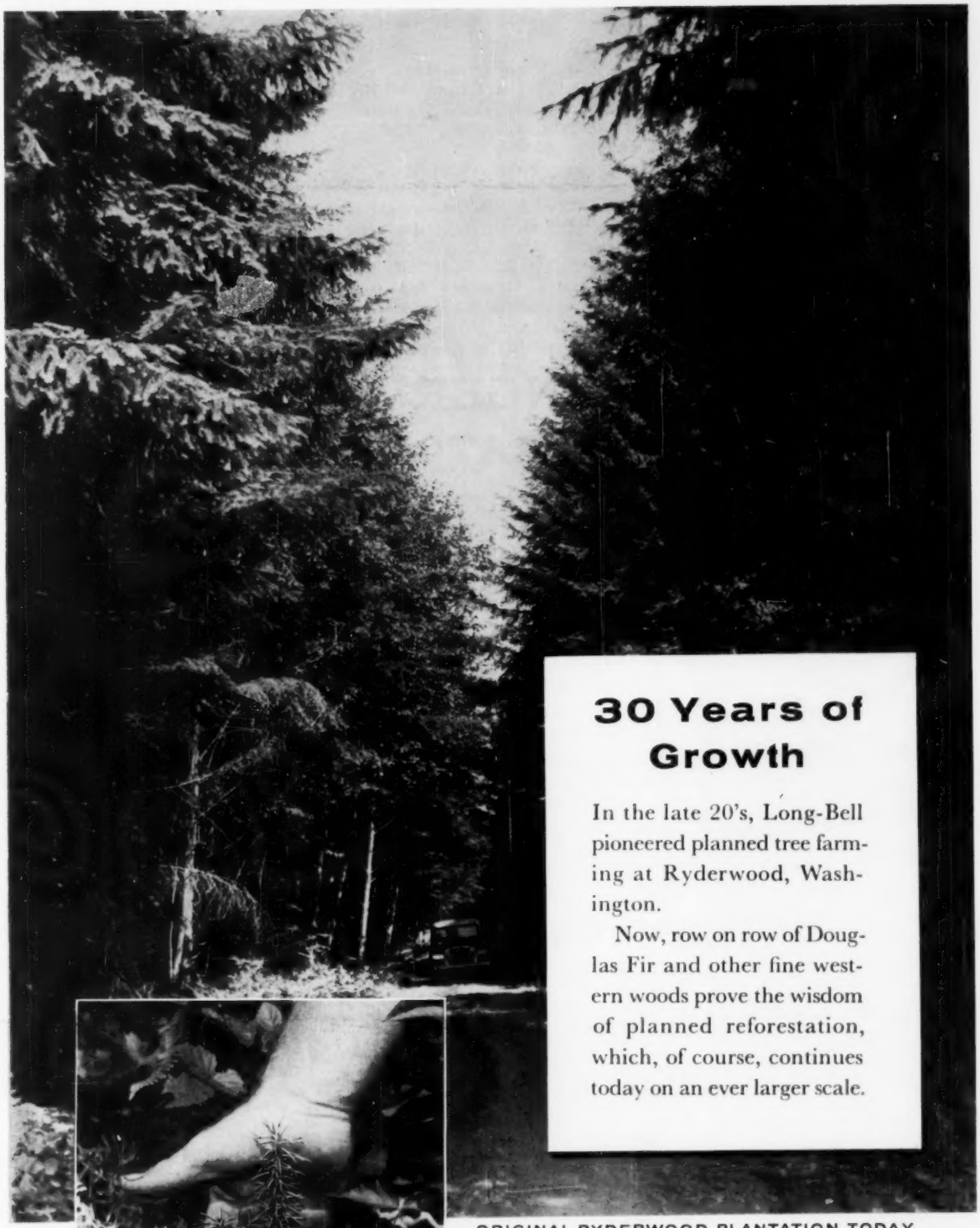

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This bulletin of 182 pages is illustrated with 37 figures and a 7-color map insert. It may be purchased from The Ohio Biological Survey, 1885 Neil Avenue, The Ohio State University, Columbus 10, Ohio. List price of this number is $3.00.

The Ohio Biological Survey is an interinstitutional agency administered through The Ohio State University to foster research and publications concerning the State's flora and fauna. Twenty-four institutions including Ohio colleges, museums and park boards cooperate in this program.

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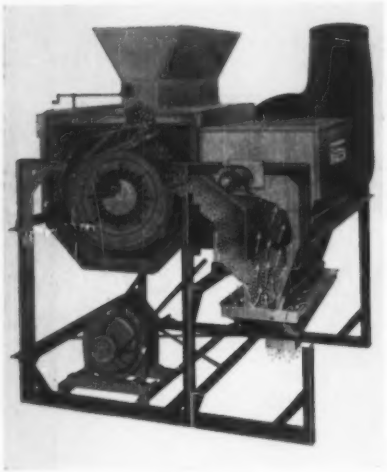

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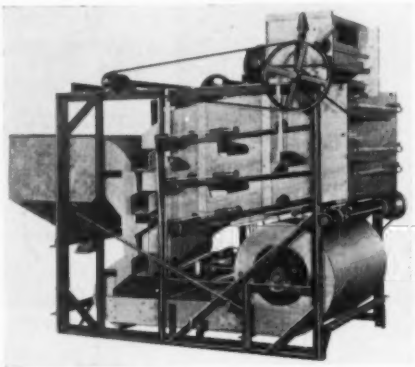

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Council's Column

Licensing of Foresters

On the 10th day of March, 1959, the Honorable S. Ernest Vandiver, Governor of Georgia, signed House Bill No. 92 into law. This act entitled "An Act to amend an Act creating State Board of Registration for Foresters, prohibiting use of title 'registered forester' except under certain circumstances, and for other purposes" had previously been passed by the General Assembly of Georgia by votes of 138 to 2 in the House and 36 to 0 in the Senate. Thus, the State of Georgia became the first state in the Union to require foresters to become licensed and registered under certain conditions. This represents the culmination of the efforts of the Georgia Chapter of the Southeastern Section of the Society of American Foresters that began in 1950, and brought forth the permissive registration act passed by the 1951 General Assembly. This particular legislation has previously been discussed in this column and by other authors in the JOURNAL OF FORESTRY.

To get the full import of this compulsory licensing act, we quote Sections 1, 2, and 12 from the 1959 Act as follows:

"Section 1. General Provisions. (a) No person shall use in connection with his name or otherwise assume, use or advertise any title or description tending directly or indirectly to convey the impression that he is a registered forester, without first having been licensed and registered as a registered forester as hereinafter provided.

(b) Except as hereinafter specifically authorized, no person shall engage in the practice of professional forestry as defined in this Act, or in any manner advertise or hold himself out as engaged in such practice, without first being licensed as a registered forester under this Act.

(c) Notwithstanding paragraph (b) or any other provisions of this Act, nothing herein shall be construed as preventing or prohibiting any person from managing or otherwise conducting forestry practices on land owned, leased, rented or held by such

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person; nor shall anything herein prohibit any regular employee or official of any person, corporation, agency, institution or other entity from engaging in professional or other forestry practices on lands owned, leased, rented or held by such person, corporation, agency or other entity; nor shall anything herein prohibit any graduate of a school of forestry from practicing forestry under supervision as hereinafter authorized, so as to qualify for licensing as provided in Section 12 hereof.

(d) It is the purpose of this Act to protect the public by improving the standards relative to the practice of professional forestry.

Section 2. As used herein, the following terms shall have the meaning and definitions hereafter stated:

(a) 'Registered forester' shall mean a person who has registered and qualified under this law to engage in professional forestry practices as hereinafter defined.

(b) 'Professional forestry' or 'Practice of professional forestry' shall mean any professional service relating to forestry, such as investigation, evaluation, development of forest management plans or responsible supervision of forest management, forest protection, silviculture, forest utilization, forest economics, or other forestry activities in connection with any public or private lands. Provided, that forestry instructional and educational activities shall be exempted. Provided further, however, any person, who on the effective date of this Act, shall have been engaged in the active practice of forestry as defined herein for at least ten years with such practice to be acceptable to the board as defined in Section 12 (b), shall be eligible for registration as a registered forester without reference to the requirements set forth in Section 12 (a) of this Act, provided that he file application for registration with the board within six months from the effective date of this Act. The board shall issue licenses only to those applicants who meet the requirements of this section. Provided that no person shall be eligible for registration as a registered forester who is not of good character and reputation. Provided further, that employees of the State and Federal governments assisting farmers in agricultural programs shall be exempt from the provision of this Act.

(c) 'Board' shall mean the State Board of Registration for Registered Foresters, provided for by this Act.

Section 12. (a) General Requirements for Registration. The minimum qualifications and requirements for registration as a registered forester shall be as follows: (1) Graduation from a school, college or department of forestry approved by the Board, and a specific record of an additional two years' or more experience in forestry work of a character satisfactory to the Board indicating that the applicant is competent to practice forestry. Such two years' experience need not be obtained on lands owned, leased, rented or held by the applicant or by any person, corporation, agency, entity or institution by which such applicant is employed, so long as said applicant works under supervision of a registered forester or under other supervision acceptable to the Board. (2) Graduates of schools of forestry not approved by the Board may be licensed after two years of experience of a character satisfactory to the Board and under the supervision of a Registered Forester or under other supervision acceptable to the Board, and who shall have successfully passed a written examination designed to show knowledge and skill approximating that obtained by graduation from a school, college or department of forestry approved by the Board. The Board shall issue licenses only to those applicants who meet the requirements of this Section; provided, however, that no person shall be eligible for registration as a registered forester who is not of good moral character and reputation.

(b) It shall be the duty of the Board by rule or regulation to define supervision and experience as used in this Act, and in so doing, the Board shall consider and give effect

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ASSURES WOOD SUPPLY

THE planning a business does and the planning people do are often very similar. If you had inherited a substantial piece of property which was going to provide a livelihood for you and your children—and their children—you would certainly protect and try to enhance the value of this legacy in every way you knew how, while making it earn a substantial return.

GREAT Northern has this sort of legacy in its timberlands, which extend over a large part of the spruce-fir region of Maine. A good part of this land was purchased on behalf of the Company by men who saw—more than half a century ago—the tremendous potential of this northern wilderness as a never-ending source of wood—the raw material for the making of paper. Today Great Northern's employees are busy protecting this property, while at the same time making it pay its way.

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Mouse ~~MOOSE~~ HUNTING SPORTSMEN!

Wildlife is very much a Tree Farm crop. Well managed forest lands produce an abundance of forest creatures. Such an abundance, in fact, that our growing forests are often seriously threatened. Deer, elk, and bear each year cause untold damage to growing trees. However, their numbers can be controlled. The sportsman provides the answer!

Hunters can effectively help in keeping deer, elk, and bear populations at a manageable level. Unfortunately, their help cannot be enlisted in the harvest of another abundant wildlife crop. Rodent pests such as rabbits, porcupines, and particularly the white footed mouse, present a troublesome and costly forestry problem.

Private, state, and federal forest land managers are becoming increasingly concerned over this problem. However, prompt and effective action is needed — NOW!

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to the directness, immediacy, scope, extent, quality and constancy of such supervision, and as to experience, the nature, quality and extent thereof."

It can be seen from the reading of these provisions of the Act that certain compromises were made by the General Assembly to satisfy small groups (who might have objected to the overall compulsory requirements for registration) in that certain exemptions were made. It is interesting to note that the Georgia Chapter of the Southeastern Section meeting in Savannah in June 1959, overwhelmingly voted to present a further amendment of the Act to the 1960 General Assembly. This would eliminate the provision exempting employees of the state and federal governments assisting farmers in agricultural programs. Active committees are presently pursuing this mandate of the Georgia Chapter.

Critics of compulsory registration have cited that such legislation has the overtones of unionization. This is untrue, in that under the Georgia Statute, a forester may work on his own lands, or that of his regular employer without being required to obtain a license. It is only when the forester beings to practice forestry before the general public that he must be deemed qualified by an official board representing the sovereign State of Georgia. Thus, the best interests of the general public are protected, as they should be.

It is not the intent of this particular Council's Column to comment on all the benefits that accrue from licensing and registration. This subject has been quite adequately reviewed by many others. Upon proper reflection any thinking forester can realize that legal licensing has many advantages and opportunities for professional enhancement and protection of foresters in general.

This Council's Column did want to present to the readers of the JOURNAL OF FORESTRY a portion of the new compulsory licensing act of the State of Georgia for their own edification and guidance.

In conclusion, the opinion is ventured that any permissive registration act represents the fact that the state so enacting same, recognizes legally that there is a profession of forestry and that it has something to offer, but to be sure the best interests of the general public are protected, certain definitions, limitations, and requirements must be met. When that state or states makes registration and licensing a requirement and compulsory, then can it not be determined that the profession of forestry has truly arrived and taken its proper place in the legal hierarchy of the other great professions of our day?

B. E. ALLEN

Comment on Minnesota Registration Bill

Now that the longest session in history of the Minnesota State Legislature has come to a close, there is time for objective analysis of what happened to the bill for registration of foresters submitted by Minnesota members of the Upper Mississippi Valley Section of the Society of American Foresters.

Introduced with high hopes early in

IT'S BUT A LITTLE WAY...

It's but a little way from the forest to the grocery store where Mrs. Housewife loads her shopping basket with quality paper products produced according to her desires.

As the demand for paper increases daily, the forests of our country must supply ever-increasing amounts of wood. Fortunately, more and more of the management of our woodland resources is being placed in the hands of professional foresters willing to accept the challenge of perpetuating our national timber crop.

These trained foresters manage nature's tallest crop—protecting it—improving it—selecting it for proper and timely harvesting—replenishing the valuable heritage so important to each of us as an economic asset and as an enduring source of recreation and relaxation.

Yes, the forest will remain, and is indeed but a little way from the grocery store.

SCOTT PAPER COMPANY

the session, this bill was lost in committee. It is not easy to write about such an ignominious defeat without becoming acrimonious since the defeat was due to union opposition rather than provisions of the bill itself.

Unions took the position, at legislative committee hearings, of "not having been consulted when this bill was formulated." They saw to it that this bill was tabled "in order to give us time to study the bill." This latter statement was made five months after the bill's acceptance by the membership of the Upper Mississippi Valley Section when copies of the final bill were made available. It was also made in the face of a bill revised to conform with union objections brought out at a meeting between their Legislative Committee and the author four months earlier.

Regardless of the purported how and why of union opposition, professional foresters as well as professional people in every field should take pause for serious reflection. Is our problem of registration the question, or do we find ourselves involved in the opening gambit of a much larger game?—one which threatens the very identity of professionalism.

It has been decreed by society that we must live and let live. Therefore, an attempt will be made to draft a bill which will have the support of union groups. How this may be accomplished without subjugation of the profession of forestry while still attaining the objective of registration will be tested in Minnesota during the ensuing two years.

Arthur F. Ennis
Chairman, Professional Status Committee, Upper Mississippi Valley Section

Coming Events

Canadian Institute of Forestry

Annual meeting will be held at Prince George, B. C., October 6-9.

Lake States Forest Tree Improvement Conference

The Fourth Lake States Forest Tree Improvement Conference has been scheduled for October 6 and 7, at the University of Michigan, Ann Arbor.

Central States Section

A joint meeting of the Central States Forest Tree Improvement Committee and Central States Section of the SAF will be held at the Ohio Agricultural Experiment Station, Wooster, on October 8 and 9.

Florida Chapter

The Florida Chapter of the Southeastern Section will meet October 9-10 at Marianna, Fla. Special program for the ladies is planned.

American Forestry Association

The 84th annual meeting of the American Forestry Association will be held October 11-14 at Bedford, Pa.

Natural Area Survey Gets Underway

With the selection of F. H. Eyre to head up the project, the Society's Natural Area Survey in the Southeast is now underway. Financed by a grant from Resources for the Future, Inc., the survey will endeavor to locate natural forest areas—representative units of virgin or old-growth forest types—that may be permanently preserved for future observation and research.

Some of Northern California's earliest redwood logging, over 100 years ago, was on land now a part of the Big River Unit of our C. R. Johnson Tree Farms.

Union Lumber Company operates under a program of sustained yield. We are growing trees for future generations . . . on over 170,000 acres of tax-paying, non-subsidized land.

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UNION LUMBER COMPANY

Tree Farmers — Manufacturers

Fort Bragg California

Appalachian Section Holds Summer Meeting

The Virginia summer meeting of the Appalachian Section, SAF, was held at Fredericksburg, July 31-August 1. Sixty persons attended this affair which was designed to show how the forest industry of the area is utilizing the raw material at hand and also what local landowners are doing to improve the productivity of their woodlands.

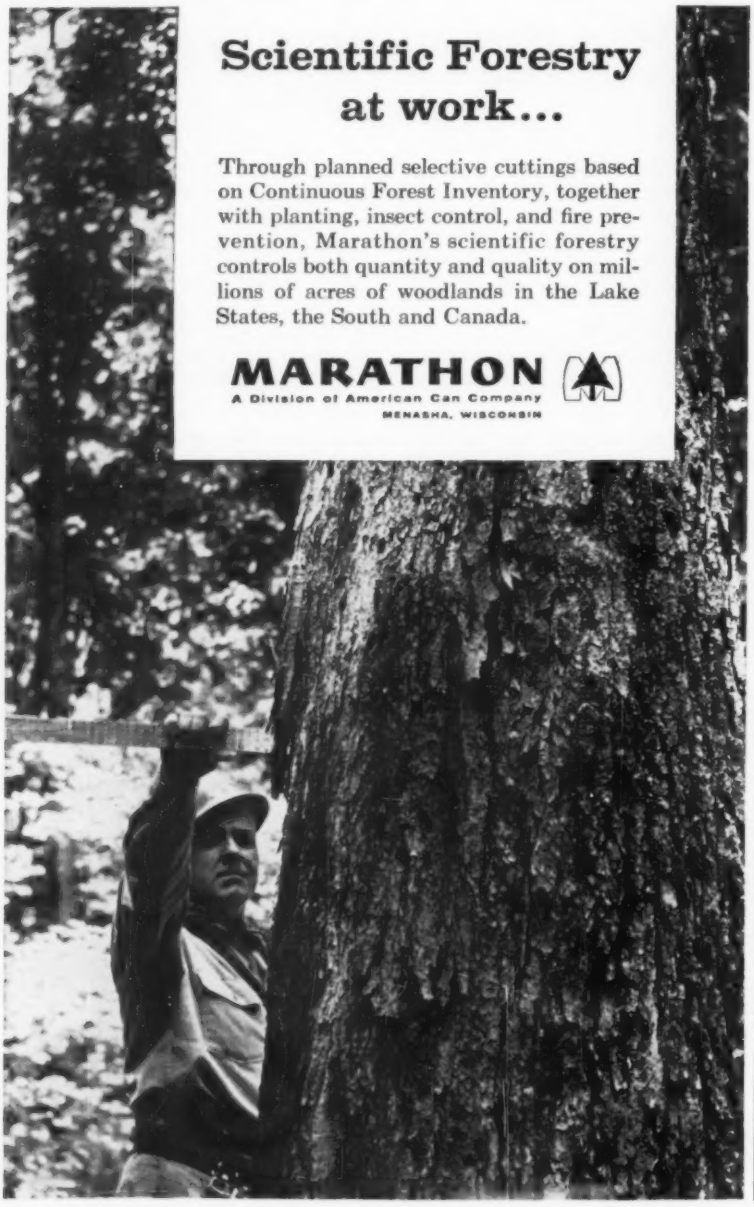
The excelsior plant of T. Frank Flippo & Sons. Doswell, was visited where a chipping installation for the manufacture of pulp mill chips was observed. The manufacture of laminated oak flooring was seen at the Crandall Corporation of Virginia plant, also at Doswell.

George N. Bobb, forester for Continental Can Co., showed a site preparation job which employed a combination of chopping, discing and controlled burning. George I. Blain, forester with the Virginia Division of Forestry, explained the management program in effect on the City of Fredericksburg's 28-year-old loblolly pine plantation.

John N. Graff, district forester, Virginia Division of Forestry, explained a visit to a poisoning and planting project on a private ownership and how a good job at low cost had been achieved. Wayne Ackerman, Second Army Forester, took the group on a tour of Camp A. P. Hill forestry projects and described how the Army was practicing forestry in all areas where it was compatible with the necessary Army training objectives.

At the banquet session E. E. Roger, chief, Forestry Relations, Virginia Division of Forestry, presided as toastmaster and introduced Kenneth B. Trousdell, acting research center leader USFS, who gave the results of a recent survey of hand planted areas in Tidewater, Virginia.

C. A. Halupka, Continental Can Co., F. W. Patton, Chesapeake Corporation of Virginia, and C. F. Glattfelder, The Glattfelder Pulp Wood Company, served as program committee.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Through planned selective cuttings based on Continuous Forest Inventory, together with planting, insect control, and fire prevention, Marathon's scientific forestry controls both quantity and quality on millions of acres of woodlands in the Lake States, the South and Canada.
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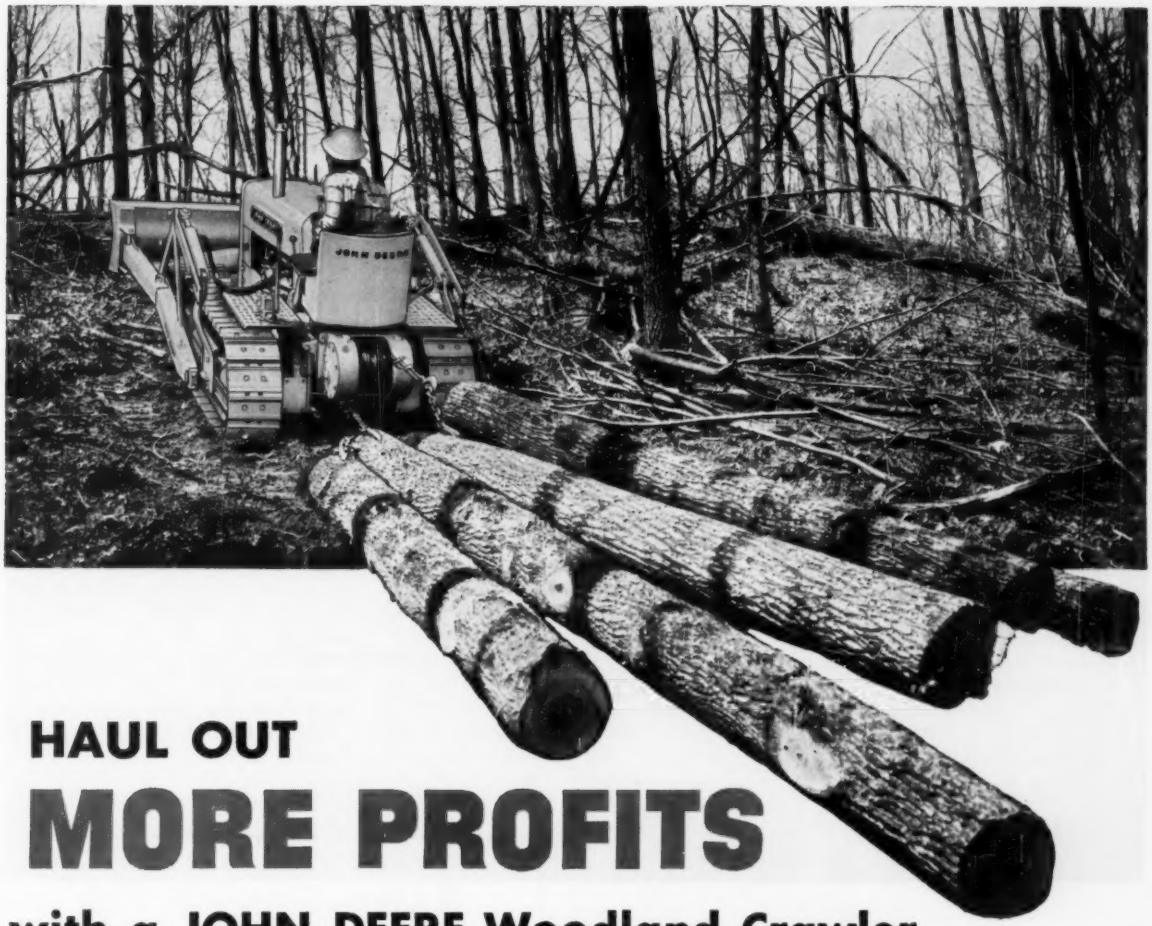
Alva W. Blackerby (1909-1959)

Alva W. Blackerby, 50, supervisor of the Nezperce National Forest, Grangeville, Idaho, died August 22 from injuries received earlier in the month in an airplane accident in line of forest fire duty.

The plane, a Ford tri-motor, crashed on landing on the Forest Service airstrip at Moose Creek on August 4. Of the five occupants, two smokejumpers were killed, and the others seriously burned by flaming gasoline from the plane's fuel tanks.

Born April 27, 1909 in Wapinitia, Ore., Mr. Blackerby was graduated from the University of Oregon in 1937 with the B.S. degree in education, and Oregon State College in 1939 with the M.S. degree in forestry.

He entered the U. S. Forest Service in 1939 as a CCC training officer in Alaska, and served successively as administrative assistant, administrative officer (personnel), deputy fiscal agent in the regional office, and supervisor of the Admiralty Division at Juneau. He had been assigned to the Nezperce National Forest on March 3, 1957.



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Lee F. Hawley (1882-1959)

Dr. Lee F. Hawley, one of the founding pioneers of the U. S. Forest Products Laboratory half a century ago and a noted research chemist, died August 19, 1959, at a Madison, Wisc. hospital. He was 77 years old.

Dr. Hawley came to Madison in 1909 as a chemist to help organize the federal laboratory set up here by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of Wisconsin. He had joined the Forest Service as a chemist in 1907.

Except for two years with Arthur D. Little, Inc., a private research organization, Dr. Hawley remained at the laboratory until his retirement in 1942 because of eye troubles.

Author of many laboratory research publications, Dr. Hawley was a co-author with Louis E. Wise of *The Chemistry of Wood*, one of a series of American Chemical Society publications. When this book was subsequently expanded and revised, he remained author of the chapter on wood combustion. He also authored a textbook on *Wood Distillation*.

Dr. Hawley was a charter member of the American Chemical Society's division of cellulose chemistry, serving at one time as its secretary. In 1952, the society honored him for his 50 years of "loyal support and faithful service." He was also a member of the Society of American Foresters.

Dr. Hawley was a native of Steamburg, N. Y., where he was born February 12, 1882.

John Hunt (1921-1959)

Dr. John Hunt, forest pathologist with the Pacific Northwest Forest and Range Experiment Station, Portland, Ore., was found shot to death, apparently a murder victim, in southern Idaho on August 25.

He had resigned from the U. S. Forest Service and was en route by automobile to New Haven, Conn., where he was to join the faculty of the Yale School of Forestry.

Born in Ontario, Calif. on October 18, 1921, he received the B.S.F. degree in 1949 and the M.S. (botany) in 1951 from the University of Washington, and the Ph.D. (forest botany) from the State University of New York College of Forestry in 1954.

During most of his brief but fruitful scientific career, Dr. Hunt had been with the Division of Forest Disease Research at the Pacific Northwest Forest and Range Experiment Station.

Ralph A. Nelson (1913-1959)

Ralph A. Nelson, district forester in charge of the Western District of Kentucky, and a member of the Kentucky-Tennessee Section, SAF, died July 28, 1959. Born in Glenwood, Minn., on July 16, 1913, he was graduated from the University of Minnesota in 1933 and subsequently joined the U. S. Forest Service where he served in various capacities on national forests, experiment stations, and in the emergency rubber project. He went to Kentucky in September 1944 as farm forester under the Norris-Doxey law. In October 1947 he transferred to the University of Kentucky Extension Service, and in July 1952 joined the Kentucky Division of Forestry.

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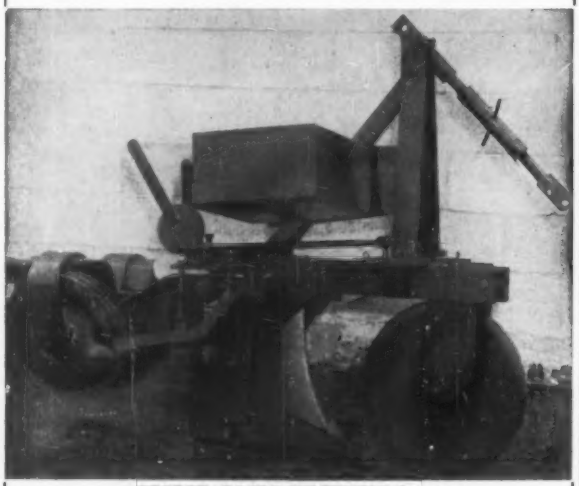

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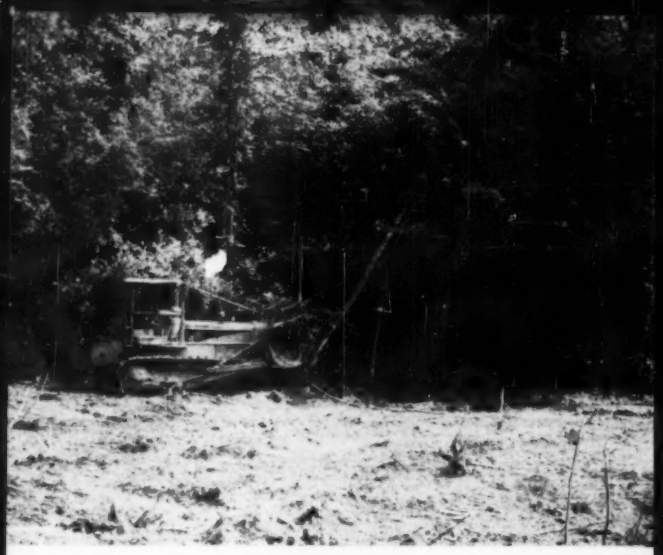

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Deadline for Consultants Listing

Consulting foresters who wish to have their names included in the Directory of Consulting Foresters, to be published in the January 1960 JOURNAL OF FORESTRY, should apply to the Society office not later than November 1, 1959. Information supplied should follow the form used in the directory published in the January 1959 JOURNAL. Members to be listed must be in good standing, i.e., have paid 1959 Society dues.

Consultants whose listings appeared in the previous directory and who have not returned inquiry cards mailed in September should do so at once.

Subscription Rate Increased Journal of Forestry

Effective January 1, 1960 annual subscription rate to the JOURNAL OF FORESTRY will be increased to $9. Foreign postage ($1) and Canadian postage (50¢) remain the same.

Renewals and new subscriptions to the JOURNAL OF FORESTRY, beginning with the January 1960 issue will be payable at the increased rate.

Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of August are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of October 1959.

Communications from the voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Junior Grade

Clements, C. M., Forester, USFS, Upper Darby, Pa. (Reinstatement).
Paradise, F. J., Forester, USFS, Upper Darby, Pa., BSF, 1931.

Students Eligible for Automatic Advancement

WEST VIRGINIA UNIVERSITY

Adams, R. W.	Hill, R. A.
Arnold, E. W.	Kellison, R. C.
Coutu, D. J.	Lee, R.
Gamber, S. M.	McBee, W. L.
Grahame, J. W.	Moyer, C. E.
Helvey, J. D.	Tice, P. F.

Appalachian Section

Student Grade

NORTH CAROLINA STATE COLLEGE

Eliades, G. K.

Member Grade

Bush, H. H., Dist. Ranger, USFS, Bridgewater, Va. (Reinstatement).
Cole, J. F., Tbr. Consultant, Lowrys, S. C. (35R59).

Central Rocky Mountain Section

Junior Grade

Thornburg, D. L., U. S. Army, Fort Carson, Colo. (Reinstatement).

Columbia River Section

Junior Grade

Bryant, H. R., Supv., Willamette Nat'l Forest, Eugene, Ore. (Reinstatement).
Burnett, L. A., Supv., Soil Conservationist, Sutherlin, Ore. (Reinstatement).
Minato, A. E., Logging Supv., Bate Lbr. Co., Merlin, Ore. (Reinstatement).

Member Grade

Clark, H. S., Chief Forester, Pope & Talbot, Inc., Oakridge, Ore. (Reinstatement).
Griffith, T. L., Proj. Staff, Wallowa-Whitman Nat'l Forest, Baker, Ore. (Junior 1952).
MacKenzie, D. E., Forest Eng., Pendleton, Ore. (Junior 1952).

Affiliate Grade

Jordan, L. H., Dist. Asst., USFS, Burns, Ore.
Morrison, R. G., Forester, Bur. of Land Mgmt., Coos Bay, Ore.

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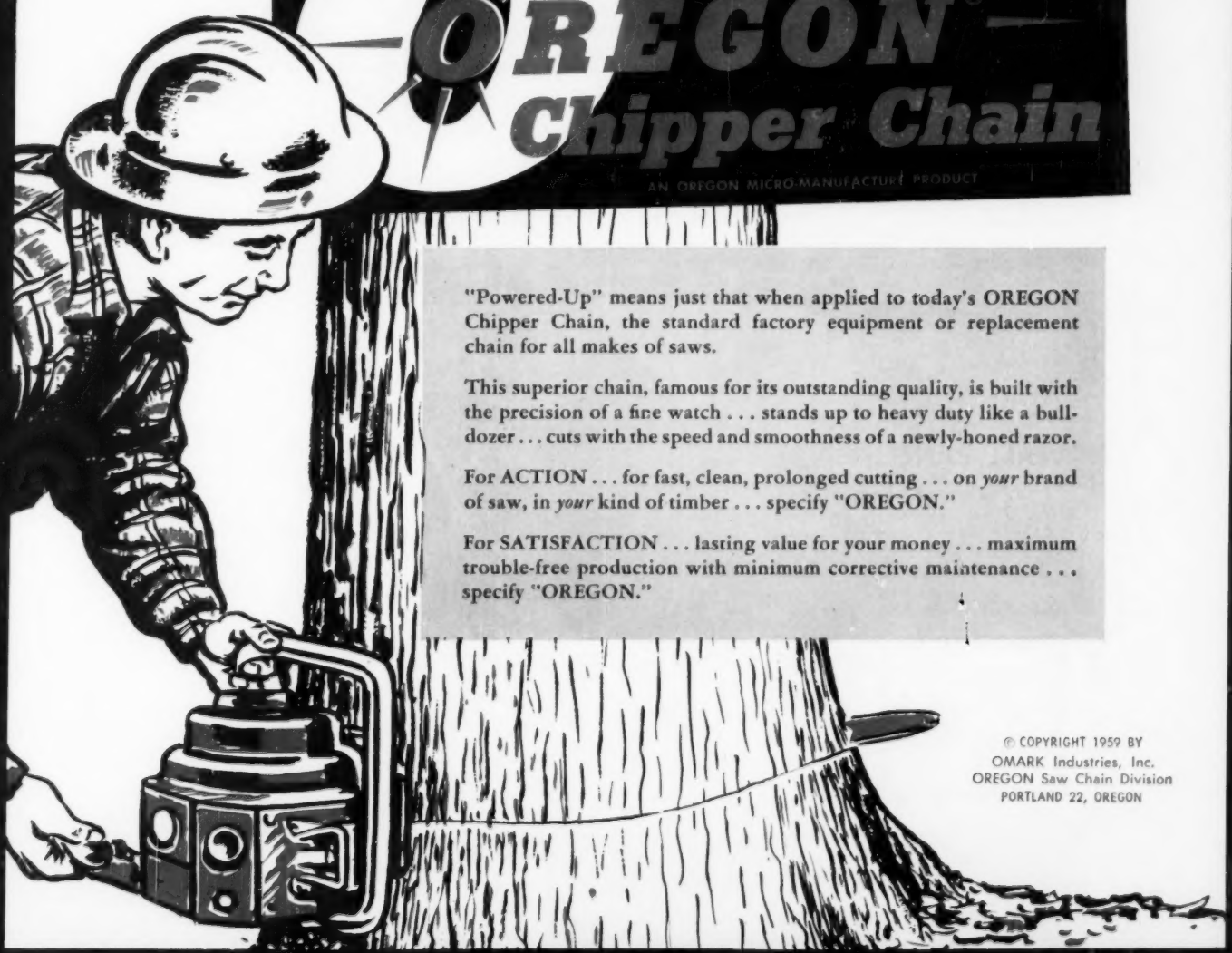

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Gulf States Section

Student Grade

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Allen, R. S. — Moon, D. R.
Bays, R. M. — Oliver, H. E.
Bergmann, E. H. — Reschar, J. C.
Campbell, W. B. — Russell, R. L.
Eubanks, C. L. — Searles, T. D.
Gibson, H. J. — Thiels, P. J.
Gillette, C. N. — Thomas, A. B.
Hall, A. — Tubbs, C. L.
Harbuck, R. S. — Vail, W. K.
Harrison, T. H. — Webb, F. W.
Hunter, A. G. — Weldon, I. D.
Lora, H. — Winberry, K. R.

LOUISIANA STATE UNIVERSITY

Ebarb, P. A.

Affiliate Grade

Irwin, F. J., Dist. Forester, Champion Paper & Fibre Co., Huntsville, Texas.

Inland Empire Section

Affiliate Grade

Olson, R. J., Forester, Soil Cons. Service, Spokane, Wash. (Reinstatement).

Intermountain Section

Junior Grade

Wilson, J. A., Asst. Snow Surv. Supv., Soil Cons. Service, Boise, Idaho, BSF, 1946.

Member Grade

Frisby, W. E., Dist. Forest Ranger, Targhee Nat'l Forest, Idaho Falls, Idaho (Reinstatement).

Kentucky-Tennessee Section

Member Grade

Willard, R. E., Forester, Cumberland Nat'l Forest, London, Ky., BSF, 1955, MF, 1959 (Junior 1955).

New England Section

Junior Grade

Staniunas, C. E., Forester, Dept. of Natural Resources, Boston, Mass., BSF, 1950.

Affiliate Grade

Adams, S. K., Forest & Park Supv., Dept. of Natural Resources, Boston, Mass.

Bliss, G. A., Asst. Dist. Forester, Dept. of Natural Resources, East Brewster, Mass.

Northern California Section

Member Grade

Mehlert, C., State Park Planner, State Div. of Beaches & Parks, Sacramento, Calif. (Reinstatement).

Ozark Section

Junior Grade

Click, D. M., Farm Forester, Mo. Cons. Comm., Van Buren, Mo., BSF, 1955.

Affiliate Grade

Craighead, M. R., Asst. Extension Forester, Okla. State Univ., Stillwater, Okla.

Puget Sound Section

Junior Grade

Zepeda, H. A., Asst. Dist. Administrator, Dept. of Natural Resources, Omak, Wash. (Reinstatement).

Southeastern Section

Student Grade

UNIVERSITY OF GEORGIA

Arnold, J. C. — Marcaurelle, R. L.
Joyner, T. H. — Smith, J. O.

Junior Grade

Brown, C. M., Area Supv., Owens-Illinois Glass Co., Jacksonville, Fla., BSF, 1951.

Lanier, J. W., 8534 Santalia Ave., Jacksonville, Fla. (Reinstatement).

Meigs, H. K., Asst. Forester, Tenn. Coal Iron Div., Fairfield, Ala. (Reinstatement).

Member Grade

Biggert, J. C., Working Circle Forester, St. Regis Paper Co., Fargo, Ga., BSF, 1954 (Junior 1954).

West, E., Reforestation Supt., Buckeye Cellulose Corp., Foley, Fla. (Reinstatement).

Woods, D. W., Forester, USFS, Erwin, Tenn., BSF, 1953 (Junior 1953).

Affiliate Grade

Chapman, V. M., Self-employed, Consultant Forester, Dublin, Ga.

Associate Grade

Trescot, J. H., Mgr., Hudson Pulp & Paper Corp., Palatka, Fla.

Southwestern Section

Junior Grade

Ruckes, H., Asst. Prof. of Forestry, Ariz. State College, Flagstaff, Ariz., BSF, 1950.

Upper Mississippi Valley Section

Students Eligible for Automatic Advancement

IOWA STATE COLLEGE

Rardin, D. L.

No Section

Junior Grade

Donegan, A. W., 3 Med. Tk Bn. 37 Armor, New York, N. Y., BSF, 1958.

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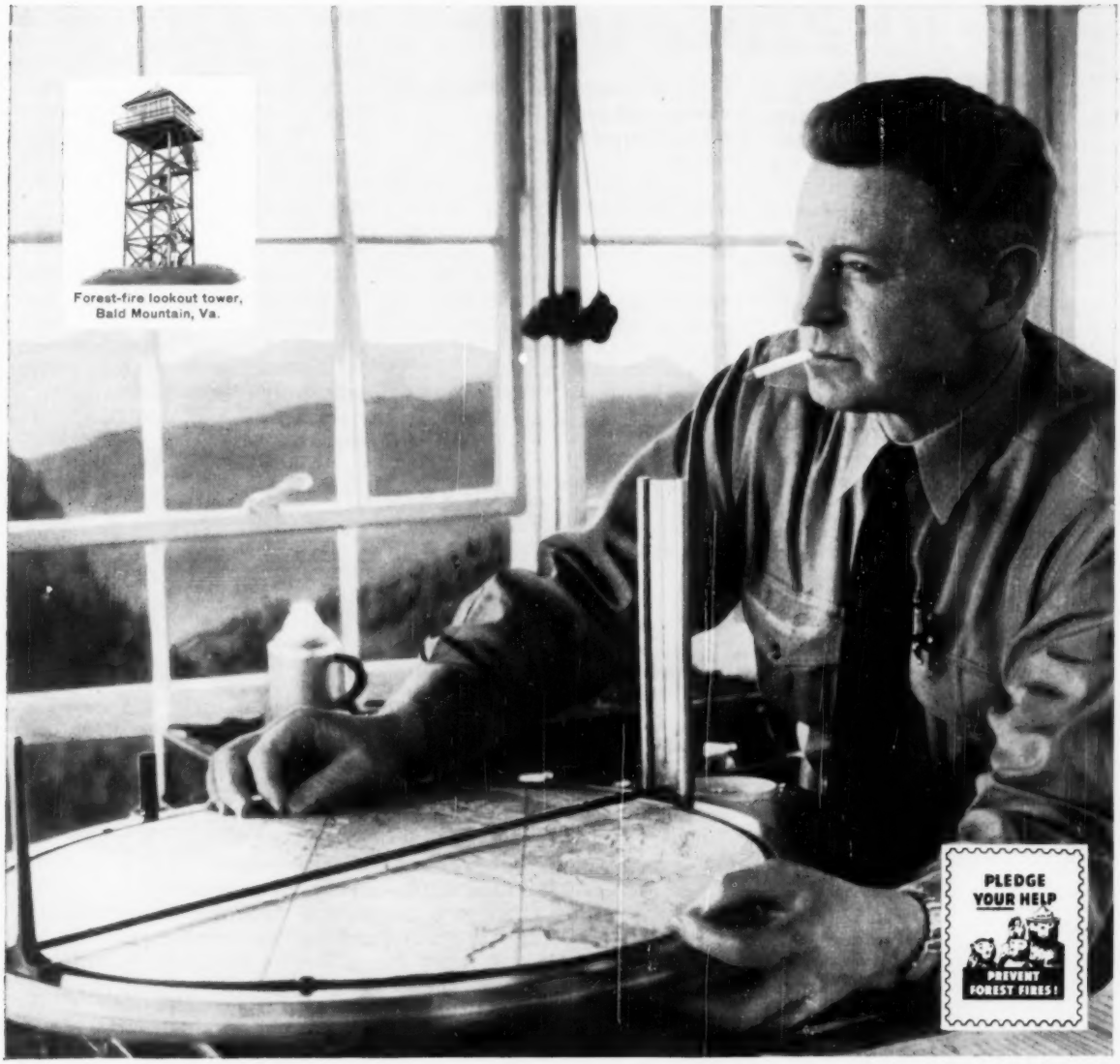

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Forestry News

Earthquake Geologic Area To Be Established

Plans to establish a special Earthquake Geologic Area in national forest lands affected by the recent violent earthquake in Montana were announced August 28 by the U. S. Department of Agriculture. An intensive survey has been started by the Forest Service to assess the effects of the August 17 and 18 massive earthquake on life, property, and the earth's surface within the Gallatin and Beaverhead National Forests.

When the survey is completed, boundaries will be determined and the Earthquake Geologic Area established under Secretary of Agriculture regulations for setting up special areas of great public interest.

The Gallatin and Beaverhead National Forests sustained the brunt of shock waves which resulted in a giant landslide and the birth of the newest natural lake in the United States.

Sentiment is already building up among the people of Montana for establishing an appropriate memorial in Gallatin National Forest in memory of the men, women, and children who lost their lives as a result of the quake. Richard E. McArdle, chief of the Forest Service, said that his organization would cooperate in any appropriate plan approved by the families concerned.

"Though the quake area is clothed in tragedy," Mr. McArdle declared, "the Forest Service recognizes that the area has tremendous new geological importance as the scene of one of America's severest earthquakes and its youngest natural lake." Physical evidence of the earthquake will be visible for centuries to come.

The Earthquake Geologic Area is expected to include the giant rock slide which dammed the Madison River, the new lake it created, and many of the prominent faults and fissures on the Gallatin and Beaverhead National Forests which resulted from this natural phenomena. Mr. McArdle stated that the area would be managed to protect and preserve evidence of earthquake action so that it will be available for observation and study. Special trails, overlooks and interpretative signs will be included. Development work will start after the emergency work of opening up roads and restoring damaged public facilities has been accomplished.

The plan to establish the Earthquake Geologic Area is another action by the Department of Agriculture through the Forest Service to manage the national forests for total public interest, Mr. McArdle said.

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The Montana earthquake is reported to be one of the strongest recorded earthquakes in recent history of the United States. The biggest earth movement of the entire quake area occurred on the Gallatin National Forest in Madison River Canyon seven miles below Hebgen Dam. There a tremendous slide, ¾ mile long, slipped off the mountain, plugging the canyon with a natural dam. A new deep water lake is forming behind the dam and is expected to back water up for six to seven miles.

The newly formed lake is growing steadily. It is expected to be fully formed within a few weeks. Forest Service spokesmen said the consensus of geologists and engineers who have examined slide forming the new lake is that it will continue to hold indefinitely.

Forest Service Receipts Top $124 Million

National forest timber sales and other land uses pushed Forest Service receipts in fiscal 1959 to a record $124,067,682, the U. S. Department of Agriculture has announced.

This was an increase of $30 million over the previous fiscal year's income. Cash receipts, the Department noted, are in addition to other benefits.

For the year ending June 30, 1959, products and uses of national forests accounted for $122,148,445, of the total. Land utilization projects brought in $1,919,237. The Forest Service now administers 4.8 million acres of the latter.

As usual, the big income producer was the sale of timber, which accounted for $115,808,877 of the 1959 total. This reflected the all-time record harvest of 8.34 billion board feet. Grazing permits brought in about $4½ million; land and power use permits some $2½ million; and the rest came from mineral leases, cropping, haying, sale of seeds and seed harvesting permits, and recreation concessions.

In November of calendar year 1958 the billionth dollar in national forest receipts went into the Treasury, representing income since the Forest Service was established in 1905. Now the total deposited in the Federal Treasury has grown to near $1,103,000,000.

Under a broad development plan—Program for the National Forests—submitted to Congress by Secretary of Agriculture Ezra Taft Benson this year, annual timber harvest under

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management could be pushed on up to 11 billion board feet within the next 15 years.

Weyerhaeuser Announces Name Change

The word "timber" was dropped from the name of Weyerhaeuser Timber Company on September 1, it was announced by President F. K. Weyerhaeuser.

At the same time, Weyerhaeuser Company will adopt a new symbol for the products it manufactures at plants in 26 states. It is an abstract tree within a triangle.

"When the company was formed 60 years ago," Weyerhaeuser explained, "it was exclusively in the business of managing timberland. Timber is still our basic resource, but its use in the company title does not indicate adequately the wide range of products we now manufacture.

"The original name doesn't take into consideration the new products to come as a result of our research and development activities," he said.

The name change was approved by shareholders at their annual meeting last May. It will apply only to the parent company and Weyerhaeuser Sales Co. Other subsidiary companies will retain their names, but adopt all other phases of the new identification system.

On October 1, Weyerhaeuser Sales Co. operations became a part of the lumber and plywood division. The move was designed to "effect maximum coordination among manufacturing, distribution, sales and customer service activities," it was stated.

The Kieckhefer-Eddy division title, created in 1957 by the merger of Kieckhefer Container Co. and The Eddy Paper Corp. with Weyerhaeuser, will be discontinued. Its operations will be grouped under divisional titles descriptive of function or product.

Existing company brand names, such as 4-Square lumber, Quad-lok containers and Weytex hardboard, will be retained, but will be supplemented with the new symbol.

At eight integrated mill sites in western Washington and Oregon, Weyerhaeuser produces containerboard, kraft and sulfite pulp, Prestologs, plywood, hardboard, lumber, bark and wood fiber products, home and industrial insulation, particle board, Ply-Veneer, chemicals, and moldable wood fiber.

Pulp and paperboard is manufactured at mills in Michigan, New Jersey and North Carolina.

Milk cartons are produced in 11 states. Shipping containers and folding cartons come from 24 plants in 18 states.

Industrial & Private

Value of Southern Pulpwood Production Climbs

The value of pulpwood produced in the South totaled $404,660,000 in 1958—an increase of two percent over 1957—according to the Southern Pulpwood Conservation Association, Atlanta.

This value was based on a 12-state pulpwood production survey by the U. S. Forest Service Experiment Stations in Asheville, N. C., and New Orleans, La., in cooperation with SPCA, Atlanta.

Georgia led the South with total purchases of pulpwood valued at $81,860,000. Alabama followed with a crop valued at $52,480,000. Each of the remaining southern states except Tennessee and Oklahoma harvested a pulpwood crop valued in excess of $25,000,000.

The survey revealed that more than 16 percent of the total pulpwood production was hardwood. This usage has been annually increasing for the past several years.

The survey showed an all-time high of nine percent of the total production of pine and hardwood pulpwood came from the use of sawmill slabs and veneer cores, for which the pulp and paper industry provided a market.

More than 90 percent of the South's counties shared in this income. Both Mississippi and South Carolina reported production from 100 percent of their counties; Alabama and Georgia reported production in all but one county; and Florida in all

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but two counties in 1958.

The growth of the pulp and paper industry, providing a constant market for pulpwood in practically all forested counties in the South, has, according to H. J. Malsberger, general manager, SPCA, "provided nearly every forest owner with a strong incentive for managing his tree crop."

Reappointment of Chairman, C of C Natural Resources Committee

Reappointment of David L. Francis, president of Princess Coals, Inc., Huntington, W. Va., as chairman of the Natural Resources Committee, Chamber of Commerce of the United States, has been announced by Chamber President Erwin D. Canham.

With representation from all parts of the country, the 45-member committee advises the Board of Directors on issues affecting coal, electric power, forestry, land management and grazing, oil and gas, mining, recreation, and water resources.

Members of the "Forest Products" group of the committee are: Howard D. Bennett, Appalachian Hardwood Manufacturers, Inc.; Hardin R. Glascock, Jr., Western Forestry & Conservation Association; Dave James, Simpson Logging Company; Peter D. Joers, Dierks Forests, Inc.; Bernard L. Orell, Weyerhaeuser Company; and D. W. Timmis, Bowaters Southern Paper Corporation.

A. T. Upson Retires from Western Pine Post

A 50-year career in forestry was honored recently at Gallup, N. Mex.., when Arthur T. Upson, district forest engineer of the Western Pine Association, announced retirement.

Western Pine's Arizona-New Mexico Forest Committee, of which Upson has served as secretary the past nine years, presented him with a parchment scroll in recognition of his half century of forestry work for government and industry. The scroll was signed by associates and friends from coast to coast. Presentation was made by LeVon Dunford, Flagstaff, Ariz., chairman of the committee, and Ernest L. Kolbe, Portland, chief forester of the association.

Upson, a 1910 forestry graduate of the University of Nebraska, joined the U. S. Forest Service that year as junior forester, rose to supervisor and was chief of operations at the Forest Products Laboratory at Madison when

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in 1924 he left to affiliate with the technical staff of the National Lumber Manufacturers Association. Later he became NLMA's trade extension director. Returning to the Forest Service in 1935, Upson was named director of the Southwestern Forest and Range Experiment Station at Tucson, then in 1942 organized and directed the War Production Board's lumber and lumber products division. In 1943 Upson was chosen to head the Forest Service Tropical Region in Puerto Rico. In 1949 he returned to the states as advisor to the California Forest and Range Experiment Station at Berkeley, retiring in 1950 from federal service. Since 1951 he has served the Western Pine lumber industry as field forester and tree farm advisor in the Southwest, with Colorado and Wyoming as his territory also.

Schools

Forest Pathologist Retires

Dr. Ray R. Hirt, senior professor of forest botany, State University College of Forestry at Syracuse University, retired August 31, 1959, after almost four decades of service to the college.

Dr. Hirt is a native of Worthington, Minn. He received his Bachelor of Science degree from Hamline University in 1917 and his Master of Science and Doctor of Philosophy degrees in forest pathology from the College of Forestry in 1924 and 1928, respectively.

He joined the College of Forestry in 1921 and advanced steadily through the various academic grades and became chairman of the Department of Forest Botany and Pathology in 1946.

He became the college's first research professor in 1955, a position designed specifically to provide senior faculty members the vital time needed to complete signal research in process.

Although Dr. Hirt is officially retiring, he will continue his basic studies on the nuclear phenomenon of blister rust pathogen during the coming years until he completes his research.

Commenting on Dr. Hirt's retirement, Dr. Hardy L. Shirley, dean of the College of Forestry, said in part:

"Dr. Hirt entered forest pathology in its infancy and played a paramount part in its rapid development through the next 30 years.

"His many contributions as a teacher were outstanding.

"His research and teaching activity in forest pathology brought renown, both to the College of Forestry and to himself.

"His remarkable professional activity in his chosen field is eloquently attested to by some 70 professional papers.

"I am very happy to announce at this time," Dean Shirley said, "that the Board of Trustees of the College of Forestry is honoring Dr. Hirt, in recognition of his many outstanding contributions to the college over the years, by bestowing upon him as he retires the title of senior emeritus professor of forest botany."

Southern Illinois University Adds To Staff

Dr. Ronald I. Beazley has been appointed professor of forestry at Southern Illinois University as a forest economist in the SIU School of Agriculture. He will teach a course in forest economics during the fall term.

Before going to SIU Beazley was on the forestry faculty at the University of Minnesota where he conducted research, taught, and advised graduate students in forest economics.

A native of Halifax, Nova Scotia, he received his doctorate at Purdue University. He is a graduate of the University of New Brunswick, Canada, and received his master's degree from Yale University.

Public

J. M. Owens on European Trip

James M. Owens, director of the Forest Products Division of the Business and Defense Services Administration, U. S. Department of Commerce, will, following the completion of assignment around the middle of October as director of United States

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Trade Mission to Yugoslavia, visit several European cities for the Department, BDSA acting administrator, H. H. Hughes, has announced.

Owens will meet with officials of the Forestry and Forest Products Division of the Food and Agriculture Organization in Rome and while there he will also visit plants of the forest products industry. In Munich, Paris, and Geneva, Owens will consult with wood particle board producers and users to determine techniques of manufacture and European particle board applications. In London, he will visit hardwood lumber importers and fabricators and paper and paperboard buyers relative to the potential for United States exports of these commodities.

Mr. Owens plans to return shortly after November 1.

Personnel Changes Announced By Southeastern Station

Two personnel changes were recently announced by the Southeastern Forest Experiment Station.

Rufus Page, formerly in charge of forest utilization services for the state of Georgia, in a cooperative agreement between the U. S. Forest Service and the Georgia Forestry Commission, has moved to Asheville, N. C.

In Asheville, Page will become assistant to Walton R. Smith, chief of the division of forest utilization research.

Paul J. Bois, forest products technologist in the Asheville office for three years, will replace Page in Macon, Ga.

Page, who spent the past four years in Macon, is a graduate of North Carolina State College. Prior to World War II he was assistant extension forester for North Carolina, and extension forester for the state of Alabama. After service with the U. S. Navy during the war, Page became supervisor of the Bladen Lakes State Forest in Elizabethtown, N. C. Immediately before joining the U. S. Forest Service, he was in the pulpwood business and a consulting forester in Pittsboro, N. C.

Bois attended the University of Illinois and is a graduate of Michigan State University. Before moving to Asheville he spent five and one-half years at the Forest Products Laboratory in Madison, Wis.

T. E. Avery, a research forester with the U. S. Forest Service, joined the Division of Forest Economics Research in Asheville. He transferred

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after a year in the Washington office, where he carried on work in forest survey and photogrammetry research.

Avery holds degrees from the University of Georgia, Duke, and the University of Minnesota. He began working for the Forest Service in 1949. Then, for a year, was a management forester for Armstrong Cork Company in Macon, Ga. From 1951 to 1955 he was assistant professor of forestry at Arkansas A & M College in Monticello, Ark.

Doolittle Assigned to the Northeastern Station

Joining the Northeastern Forest Experiment Station Division of Forest Management Research is Warren T. Doolittle, who was formerly a staff assistant of this same division in the Washington office.

Doolittle joined the Forest Service in 1946 after graduating from Iowa State College. Until 1955 he did forest management research at the Asheville (N. C.) Research Center of the Southeastern Forest Experiment Station.

During this time he also completed graduate studies that led to a Master's degree in forestry from Duke University and a Ph.D. degree from Yale University.

Then for two years, Dr. Doolittle was with the Division of Forest Management Research at the Southeastern Station. From 1957 until assuming his new duties in Upper Darby, he was in the Washington office.

Axel Lindh to Washington Assignment

Axel G. Lindh, chief of the Division of Timber Management for Region One of the U. S. Forest Service, Missoula, Mont., has been promoted to a position in the Office of the Chief of the Forest Service, Washington, D. C.

Mr. Lindh will serve as director of the Division of Land Adjustments, which supervises a number of land functions for the Forest Service.

A native of Oregon, Lindh received a degree in forestry from Oregon State College in 1930.

Appointed to the Willamette National Forest in 1931, Lindh later had tours of duty in Missouri and in the Milwaukee regional office on land acquisition work. He then became supervisor of the Nicolet National Forest in Wisconsin.

In 1937 Lindh was appointed chief of the division of land acquisition in the Washington Office, a unit which is now a branch of the division he now heads. While in Washington, D. C. he was detailed to the timber salvage and hazard reduction program which followed the New England hurricane of 1938.

Lindh transferred to Missoula in 1939 as assistant regional forester in charge of the Division of Fire Control. In 1944 he was reassigned as assistant regional forester in charge of the Division of Timber Management.

AXEL LINDH

C. E. Randall Retires

Charles E. Randall, in charge of the branch of Special Reports, U. S. Forest Service, retired on June 30, after more than 35 years of service with the federal government.

During World War I, he served with the U. S. Navy.

Randall graduated from Stanford in 1920 and was then granted a fellowship at Oregon State College, where he spent a year in graduate work in

botany and forestry subjects. Later he earned an M.A. degree at George Washington University.

In 1921 Randall became a junior forest pathologist with the Bureau of Plant Industry in Washington, D. C. Two years later he resigned to go into newspaper work in Washington, returning to government service in 1927 as press information officer for the Forest Service. Since then he has served as editor, information specialist, chief of the section of Educational Cooperation, and head of the branch of Special Reports and Writing Services.

Randall is the author or co-author of numerous publications and articles and was the originator and author of "Uncle Sam's Forest Rangers," one of the earliest dramatized educational radio programs. The program was broadcast weekly from 1932 to 1944 by the National Broadcasting Company on a coast-to-coast network.

Promotion and Transfer of J. G. Heintzelman

Jack G. Heintzelman, fire control officer at the Mt. Hood National Forest, was promoted and transferred, as of August 23, to the position of Safety Officer in the office of the chief of the U. S. Forest Service, Washington, D. C. Heintzelman, a native of the State of Washington and University of Washington forestry graduate, began his Forest Service career in the Siskiyou National Forest, later transferring to the Olympic National Forest, where he remained until assigned to the supervisor's staff of the Mt. Hood National Forest in 1956.

Kentucky Forester Promoted

Loy W. Shreve, Mayfield, Ky., who has been assistant district forester in charge of forest management for the Western District, Kentucky Division of Forestry, has been promoted to the position of district forester of that district. He replaced R. A. Nelson who died July 28, 1959 of a heart attack.

Shreve joined the Division of Forestry in the capacity of service forester in August 1954. He is a forestry graduate of West Virginia University.

Soil Conservation Society Honors E. I. Kotok

Edward I. Kotok, recently retired from active work in the U. S. Forest Service, received an honorary membership in the Soil Conservation Society of America at the organization's 14th annual meeting at Rapid City, S. Dak., in August.

Kotok is known internationally for his leadership and research work and development of policies and technical information which have contributed much to land management, conservation, and flood protection. He has served as a vice president of the Society of American Foresters and is a Fellow in the Geographical Society.

The Soil Conservation Society of America is an organization of over 9,500 members in 73 countries. It is dedicated to the development of the science and art of land and water management. The theme of the three-day annual meeting was "commemorating soil and water conservation progress." Well over 1,300 members and guests of the Society registered. One of the features of the meeting took place on August 26, when the first commemorative soil conservation stamp was introduced to the American public in an impressive ceremony. A special commemorative coin medallion was also presented to Hugh H. Bennett, who is one of the outstanding pioneer soil conservationists of the world and a founder of the SCSA.

Equipment

New Film on "Buschmaster," Forest Management Vehicle

Timberline Equipment Company, Bradley, Ill., has completed an 18-minute, 16mm color-sound motion picture of the Buschmaster, described as the "world's first all-purpose forest management vehicle."

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high-pressure fogging apparatus. It builds fire lines and sets backfires.

In construction and maintenance, it is adapted for road building, earth moving, road maintenance, and clearing.

In forest management, it can be used for tree planting, fertilizing, spraying, site preparation, and controlled burning.

Groups and organizations desiring to show the film should write direct to the company.

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

Positions Available

GOVERNMENT OF NEW ZEALAND

Director of Research, Forest Research Institute, Rotorua, New Zealand Forest Service

Salary up to £2,060 with provision for outstanding men to proceed to £2,160 or £2,260 on merit.

Applicants for this senior appointment must have high academic qualifications in forestry and must have achieved some distinction in forestry research.

The appointment provides scope for inspirational leadership of a research team working on all aspects of forestry and forest products.

Applications close in Washington on November 9. Application forms and further information may be obtained from the New Zealand Embassy, 19 Observatory Circle N.W., Washington 8, D. C.

Forester with experience in southern pine region for cruising, marking, management and general field work with established firm in the South. Beginning salary $400 per month, expenses, plus company benefits.

Box O, Journal of Forestry, Mills Building, Washington 6, D. C.

Positions Wanted

Forester, A.B., M.F., 1956, Michigan State Univ. Age 32, married, 1 child. Experience: Summer work in general forestry. 3 yrs. in S. E. coastal plain in woodland management. Intensive work in all phases of conversion, site preparation, planting, pine liberation, drainage etc. Desire position with private industry with opportunity for advancement, or with an aggressive consultant forester.

Box L, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S.F., 1957, Purdue. Age 24, single. Experience: Summer work during school for 3 months in the Northwest and 3 months for a large lumber company in the central states. Northern Inventory for 5 months before entering the service. Further survey training in the Army. Separation date is February 10, 1960. Desire position in the North, Northwest, or Arizona.

Box M, Journal of Forestry, Mills Building, Washington 6, D. C.

Points of Interest in California

(Map accompanies)

California is a land of contrasts: it has a wide variety of geological formations, soils, climates, and vegetation associations—from desert land in the southeast corner to towering redwood stands in the northwest corner which probably produce as much organic matter per acre as any place in the world. In the accompanying map, we have tried to spot places where visiting Society members may have an opportunity to sample this variety and visit with their professional counterparts on the ground.

We have concentrated on headquarters of public agencies where someone is likely to be on duty to advise on accessibility of areas the visitor would like to see at this time of year. (The weather is notoriously "abnormal" here, as elsewhere, when visitors arrive; it could be rainy and cool though November days are often clear and crisp, especially in the Sierra Nevada.) We have also spotted experimental and demonstration areas wherever possible because by and large they have been chosen to represent typical California environments. Only those sawmills or forest products plants known to have organized plant tours for visitors are indicated on the map. Many points of general interest are omitted—National Parks and Monuments, State Parks and Beaches, recreation areas, and historical centers. These are indicated on almost any road map distributed by oil companies.

November in the San Francisco Bay Area is usually a delightful fall period. Long-term Weather Bureau records for the month show a mean maximum temperature of 65°F., mean minimum of 50°, a 38° "lowest of record," and 7 days out of 30 with rain.

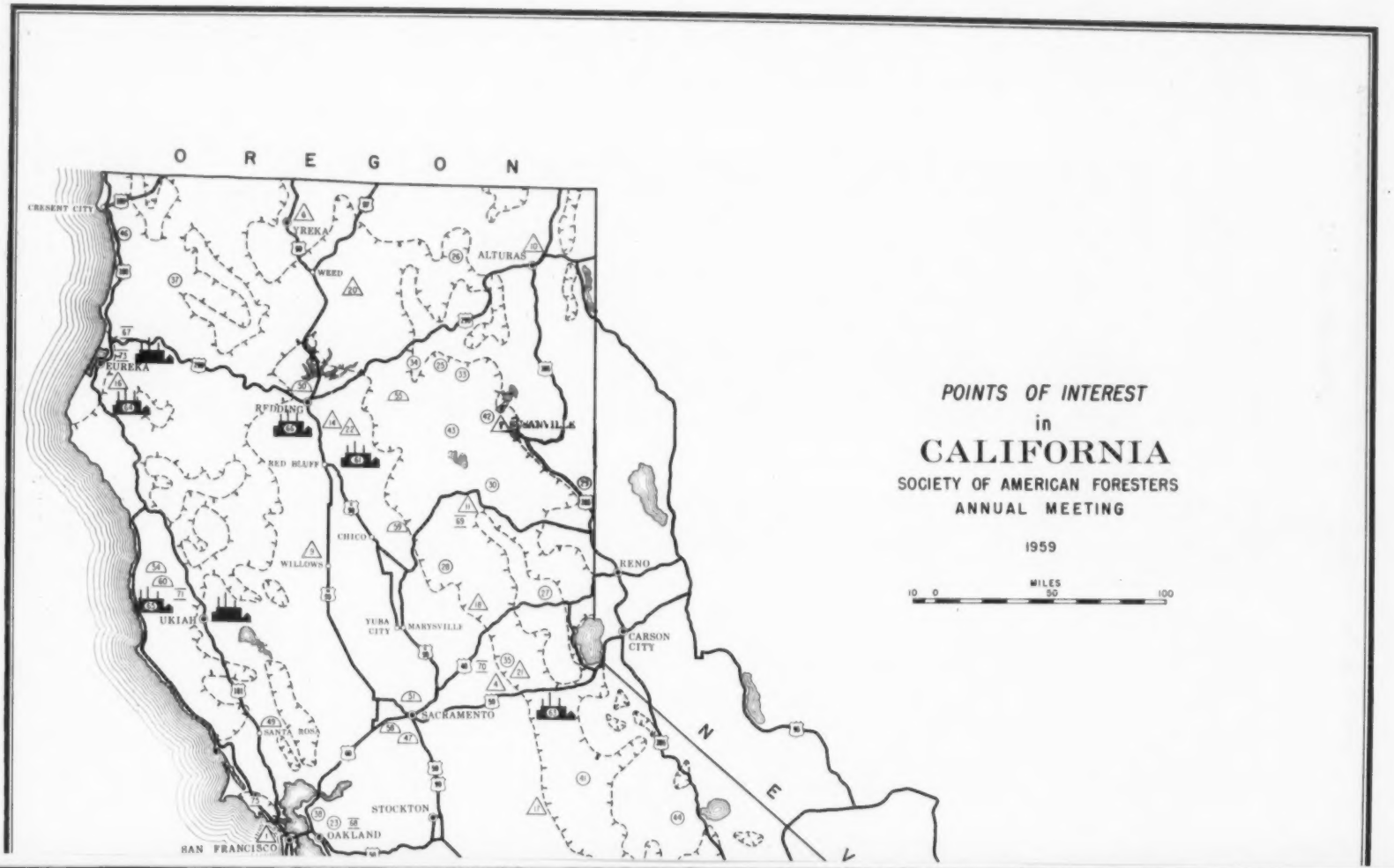
DOUGLASS F. ROY
CLYDE M. WALKER

U. S. Forest Service—National Forests

1. Regional Office, California Region. 630 Sansome Street, San Francisco.
2. Angeles National Forest. 115 S. Los Robles Ave., Pasadena.
3. Cleveland National Forest. 1196 Broadway, San Diego.
4. Eldorado National Forest. Placerville.
5. Inyo National Forest. 407 W. Line Street, Bishop.
6. Klamath National Forest. Yreka.
7. Lassen National Forest. Susanville.
8. Los Padres National Forest. Federal Building, Santa Barbara.
9. Mendocino National Forest. Willows.
10. Modoc National Forest. Alturas.
11. Plumas National Forest. Quincy.
12. San Bernardino National Forest. San Bernardino.
13. Sequoia National Forest. Porterville.
14. Shasta-Trinity National Forests. 760 Parkview Ave., Redding.
15. Sierra National Forest. 3525 E. Tulare St., Fresno.
16. Six Rivers National Forest. 331 J St., Eureka.
17. Stanislaus National Forest. Sonora.
18. Tahoe National Forest. Nevada City.
19. Arcadia Equipment Development Center. Arcadia.
20. Mt. Shasta Nursery. McCloud.
21. Placerville Nursery. Placerville.
22. Redding Smokejumper Base. Redding.

U. S. Forest Service—Research

23. Pacific Southwest Forest and Range Experiment Station. 1960 Addison St., Berkeley. Headquarters for the research branch of the Forest Service for California and Hawaii.
24. Big Creek Experimental Watershed. Fresno County, about 40 miles northeast of Fresno via State Highway 180 to Centerville and thence by the Kings River Road through Piedra and Trimmer. Study area for research on methods of managing watersheds in the foothills.
25. Blacks Mountain Experimental Forest. Lassen County, about 35 miles north of Westwood on the Westwood-Pittville Highway. Pilot plant for harvesting, regeneration, and stand improvement practices in the east-side ponderosa pine type.
26. Buttermilk Game Browse Area. Inyo County, 11 miles west of Bishop. Field trials of methods to restore game browse on deer range in a bitterbrush, sagebrush and perennial grass type. Very dry climate. Granitic soil.
27. Central Sierra Snow Laboratory. Nevada County, 2 miles west of Donner Summit on U. S. Highway 40. Field headquarters for research on snow hydrology and methods of managing watersheds in the snow zone.
28. Challenge Experimental Forest. Yuba County, adjoining the town of Challenge. Includes 2,250 acres representative of young-growth ponderosa pine on low-elevation, high-quality timber sites. Study area for harvesting and regeneration trials.
29. Doyle Game Browse Area. Lassen County, about 43 miles south of Susanville on U. S. Highway 395. Dry climate, granitic soil, and vegetation chiefly sagebrush, saltbush, some bitterbrush and annual grasses. Field trials of methods to restore game browse.
30. Feather River Experimental Forest. Plumas County, 8 miles southeast of Quincy on the Quincy-LaPorte Road. Includes about 4,000 acres of representative mixed stands of pine, true firs, Douglas-fir, and incense cedar on the western slopes of the Sierra Nevada. Inactive.
31. Flukey Springs Browse Area. Modoc County, 20 miles northwest of Canby on State Highway 139. Representative of bitterbrush, juniper, perennial grass cover on winter deer ranges on northeastern California plateau. Moderately dry climate. Soil of basaltic origin. At 4,300 feet elevation. Field trials of methods to restore game browse.
32. Forest Tree Physiology Laboratory. Los Angeles County, Pasadena, on the campus of the California Institute of Technology. Plant physiology laboratories, greenhouses, and Earhart Plant Research Laboratory (for growing plants under controlled environmental conditions). Fundamental physiology of forest trees to improve artificial and natural regeneration of forests.
33. Harvey Valley Experimental Range. Lassen County, about 30 miles north of Westwood and east of Westwood-Pittville Highway. A typical grazing allotment of about 32,000 acres. Representative of perennial type mountain summer ranges including cutover pine timber and intermingled meadows. Pilot area for a test of rest-rotation range management system in the bunchgrass type.
34. Hat Creek Forest Insect Laboratory. Shasta County, about 25 miles north of Manzanita Lake, Lassen National Park, by way of State Highway 89. Headquarters for forest insect survey activities in northeastern California and field laboratory for studying bark beetles and other insects that attack "eastside" forests.
35. Institute of Forest Genetics, El Dorado County, about 5 miles east of Placerville by way of U. S. Highway 50. Center for research in forest genetics and tree breeding. Facilities include the Eddy Arboretum which is probably the most complete collection of the world's pines plus laboratories, nursery, and field plantings.
36. Miami Forest Insect Laboratory. Mariposa County, about 3 miles south of Yosemite National Park on State Highway 41. Biology, ecology, behavior, and control of insects that attack forest trees in the mixed-conifer type. Studies include work on residual-type chemical sprays for bark beetle control.
37. Orleans Forest Insect Laboratory. Humboldt County, at Orleans on the Klamath River Highway about 90 miles northeast of Eureka. Field laboratory for studying Douglas-fir cone and seed insects, and headquarters for forest insect survey activities in northwestern California.
38. Richmond Fire Laboratory. Contra Costa County, Richmond, on the grounds of the Engineering Field Station, University of California. (Near University of California Forest Products Laboratory.)
39. San Dimas Experimental Forest. Los Angeles County, San Gabriel Mountains northeast of Glendora. Includes 17,000 acres in San Dimas and Big Dalton Canyons. Representative of the chaparral-covered mountains of southern California. Principal center for research on methods of managing brushland watersheds and field headquarters for forest fire research in southern California.
40. San Joaquin Experimental Range. Madera County, about 28 miles north of Fresno on State Highway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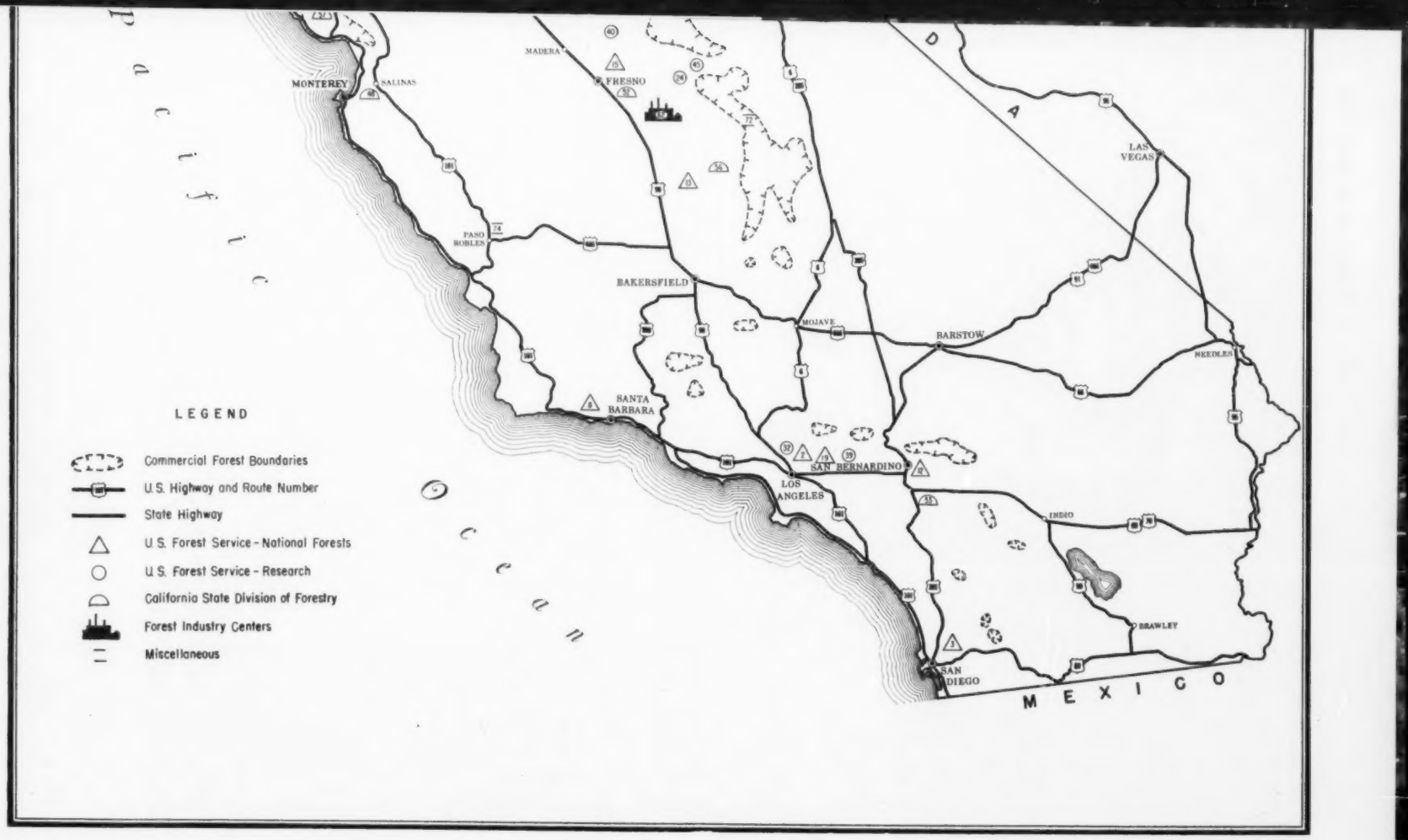
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U.S. Forest Service - Research
California State Division of Forestry
Forest Industry Centers
Miscellaneous

41. About 4,600 acres of land representative of the annual-plant ranges of the Sierra Nevada foothills, including open grassland and woodland. Principal center for research on annual-type ranges.
41. Stanislaus Experimental Forest. Tuolumne County, 30 miles east of Sonora by way of State Highway 80. Includes about 1,500 acres representative of mixed-conifer stands at middle elevations in the westside Sierra Nevada. High site quality for sugar pine. Study area for tests of regeneration and growth after harvest cutting.
42. Susanville Research Center. Lassen County, 617 Main Street, Susanville. Headquarters for range and timber management research in northeastern California.
43. Swain Mountain Experimental Forest. Plumas County, about 10 miles north of Westwood on the Westwood-Pittville Highway. Site of tests for development of silvicultural management method for white fir and California red fir forests. Includes 6,000 acres representative of high-altitude true-fir forests in the Sierra Nevada-Cascade Range.
44. Tuolumne Meadows Forest Insect Laboratory. Tuolumne County, at the head of Tuolumne Meadows in Yosemite National Park. Representing typical high Sierra country resulting from glacial action in granite peaks where lodgepole pine predominates. Other species in order of abundance are mountain hemlock, red fir, western white pine, whitebark pine, and Jeffrey pine. Field laboratory devoted to studies of the biology and control of the lodgepole pine needle miner.
45. Teakettle Creek Experimental Forest. Fresno County, about 73 miles east of Fresno in the North Fork drainage of Kings River. Includes 1,900 acres representative of mixed-conifer and true-fir forests in the snow zone of the Sierra Nevada. Pilot plant area for the high Sierra snow zone.
46. Yurok Redwood Experimental Forest. Del Norte County, 4 miles north of Klamath on U. S. Highway 101. Contains about 955 acres representative of North Coast forests of redwood and Douglas-fir. Studies of management and utilization in the redwood timber type.

California State Division of Forestry

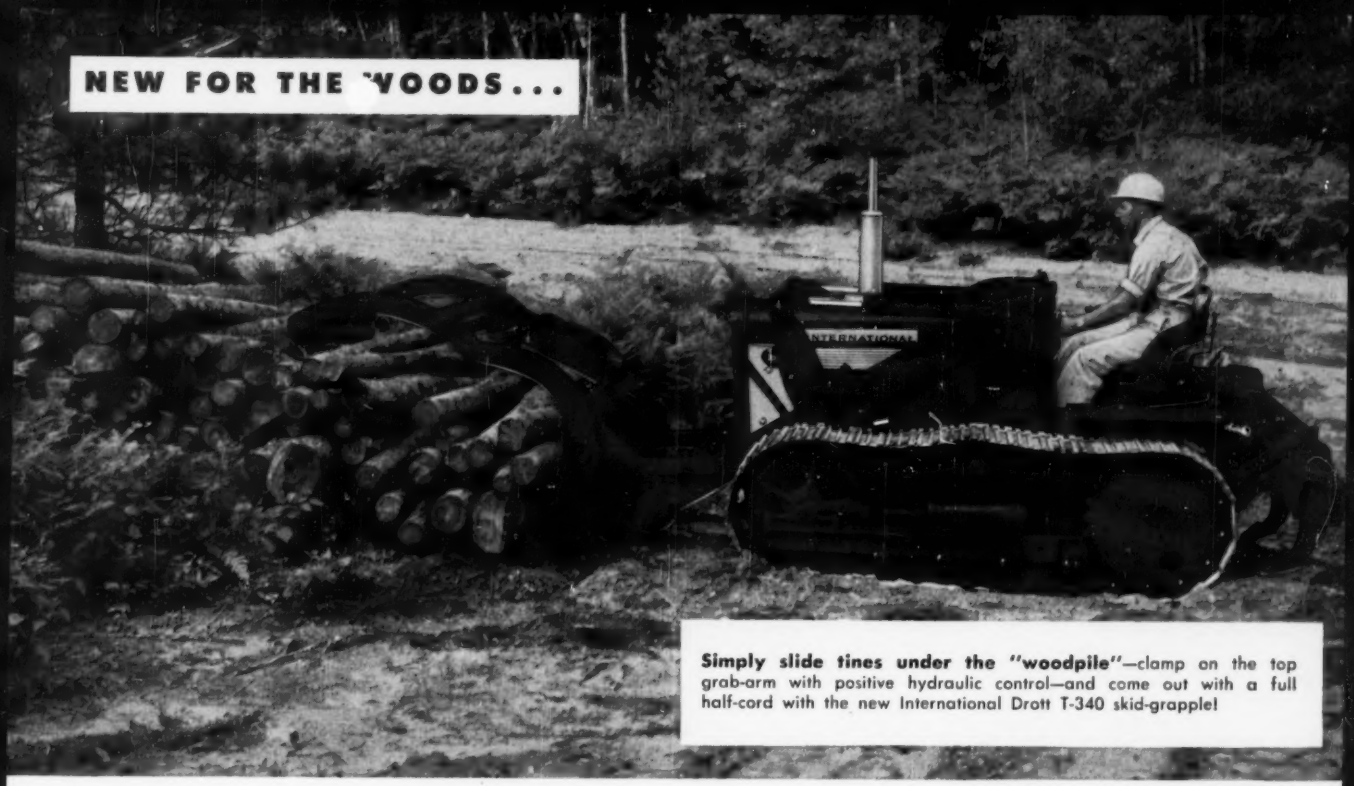
47. State Forester's Headquarters. 301 State Office Building No. 1, 10th Street and Capitol Avenue, Sacramento.
48. Central Coast District. 480 Calle Principal, Monterey.
49. North Coast District. 135 Ridgeway Avenue, Santa Rosa.
50. Northern District 1000 Cypress Street, Redding.
51. Sacramento District. 1001 Jed Smith Drive, Sacramento.
52. San Joaquin District. 1234 East Shaw Avenue, Fresno.
53. Southern District. 2524 Mulberry Street, Riverside.
54. Jackson State Forest. Mendocino County, east of Fort Bragg on the Fort Bragg-Willets Road. 52,040 acres. Young-growth redwood stands.
55. Latour State Forest. Shasta County, 50 miles east of Redding. North of State Highway 44, vicinity of Viola. 9,013 acres. Mixed-conifer timber type.
56. Mountain Home State Forest. Tulare County, 40 miles east of Porterville. Headquarters at Springville. 4,560 acres in mixed-conifer type including giant sequoia trees.
57. Ben Lomond State Forest Nursery. Santa Cruz County, 15 miles north of Santa Cruz.
58. Headquarters Nursery. Yolo County, 4 miles east of Davis on U. S. Highway 40. Seed processing, seed and tree distribution. Coordination of state nursery work, and production of planting stock for low elevation plantings.
59. Magalia State Forest Nursery. Butte County, 8 miles north of Paradise.
60. Parlin Fort State Nursery. Mendocino County. In Jackson State Forest, located 12 miles east of Fort Bragg.

Industry Mills Providing Tours

61. Diamond Gardner Corporation. Tehama County, Red Bluff, on U. S. Highway 99.
62. Ivory Pine Company. Tulare County, Dinuba.
63. Michigan-California Lumber Company. El Dorado County, Camino, on U. S. Highway 50.
64. The Pacific Lumber Company. Humboldt County, Scotia, on U. S. Highway 101.
65. Union Lumber Company. Mendocino County, Fort Bragg, on State Highway 1.
66. Ralph L. Smith Lumber Company. Shasta County, Anderson, on U. S. Highway 99.

Miscellaneous

67. Humboldt State College. Humboldt County, Arcata. Offers four-year course in forestry.
68. University of California School of Forestry. Berkeley. Forest Products Laboratory operated by the School of Forestry is at the University's Engineering Field Station in Richmond; inquire at the School for directions.
69. Camp Californest. Plumas County. Meadow Valley.
70. Blodgett Forest. El Dorado County, Georgetown.
71. Howard Demonstration Forest. Mendocino County, south of Willits.
72. Whitaker Forest. Tulare County. Young-growth stands of giant sequoia.
73. Arcata Community Forest. Humboldt County, Arcata. Young-growth redwood and "white wood" stands.
74. Charcoal plant. San Luis Obispo County, Paso Robles, north edge of city.
75. Muir Woods National Monument. Marin County, near Mill Valley. Stand of redwoods close to San Francisco; bus tours possible.



Simply slide tines under the "woodpile"—clamp on the top grab-arm with positive hydraulic control—and come out with a full half-cord with the new International Drott T-340 skid-grapple!

Half-cord capacity...utility-priced!

New International Drott T-340 skid grapple

Now you can own the "minimum crew" advantages of the famous logger-developed International Drott skid-grapple—teamed with the new, cost-cutting International T-340 crawler!

You get the original patented top grab-arm action to clamp onto a full half-cord of pulpwood (or similar weight of saw-logs)—to give you positive load-control, all the way. With pry-over-shoe action you get 11,200 lb. of break-out force to wrench loose the grapple-full—even wood that's frozen down or mudded in!

You get woods-worthy performance and long life features in the T-340, entirely new in a crawler of this size! The long-life tracks, for example, have bridge-strong U-channel frames for loading and logging on rough terrain. Heat-treated forged steel rollers are fitted with bronze bushings and have big-capacity lube reservoirs, effectively sealed. The high-torque, 4-cylinder, International 45 hp* engine gives the T-340 the wallop to challenge bigger rigs!

See how the sensibly-priced T-340 skid-grapple can streamline your operations—multiply your profits! Ask the nearby International Harvester dealer to demonstrate on your job. For his name and address, write International Harvester Company, Dept. JF-10, P. O. Box 7333, Chicago 80, Illinois.

You can "semi-skid" the load to the truck—then lift to full height of 9¾ ft. in only 6.4 seconds! Interchange the skid-grapple with bucket or blade and you've got an all-purpose road-building rig!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

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Mr. Clarence L. Tucker of Sandpoint, Idaho is a man who knows what he wants from a chain saw and he also knows that when you cut big timber, it pays to buy the best . . . the Homelite 7-21C.

With a gear ratio of 2.8 to 1, the 7-21C has all of the extra lugging power you need to fell trees up to 7 feet in diameter at speeds that cut through 20″ trees in 18 seconds. Its balanced 21 pounds (less bar and chain) make it easy to handle on the job, easy to carry to the job. Big fuel tank lets you cut longer between refuelings.

Famous Homelite short-stroke engine and quality features reduce maintenance and down-time. It adds up to more cutting time and greater profits for you.

PROOF — In his letter Mr. Tucker had this to say: "The new Homelite is the finest saw, bar none, I have ever used. I have used three other makes and would place my Homelite against any of them for cutting."

Ask your Homelite dealer for a free demonstration of the 7-21C and find out for yourself. And be sure to see the full Homelite quality line of chain saws for professionals.

As little as $6.10 weekly after small down payment

- **only 21 pounds less bar and chain**
- **fells trees up to 7 feet in diameter**
- **straight blades 14″ — 60″**
- **16″ plunge-cut bow**
- **clearing bar, brush cutter**

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